AUGUST 25, 1958

STEEL
The Metalworking Weekly

A PENTON PUBLICATION

Explosive Forming:

World's toughest metals are forced into space age shapes with fantastic ease . . . Page 82

● Auto Strike Would Nip Mild Recovery . . . Page 47

● How To Figure and Boost Productivity . . . Page 52

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it's mainly a matter of TIMING!

But how do you really KNOW when a machine has reached retirement age?

ANY machine tool could be made to last *forever* — if you kept on maintaining and repairing it forever. In fact, if you put enough money into its maintenance, you could keep it "good as new" indefinitely. But there's an economic limit to the maintenance money you can spend. And there also comes a time when "good as new" is no longer *good enough!*

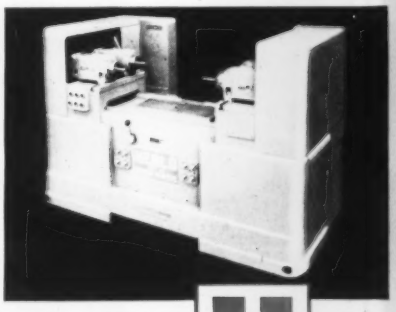
But, from the standpoint of production cost and return on investment, there *is* a mathematically predictable retirement age for any machine. Replacing it before this time is a waste of money. Retaining it *beyond* this time means a financial *loss* — often a substantial one!

Don't trust guesswork or rule-of-thumb computations to give you the right answer. There's too much money at stake.

Our sales engineers are well experienced in precise methods of replacement analysis. If you're in doubt — or would like to check your own figures — just call in your Heald engineer. He will be glad to help you. Similar obsolescence studies have effected many important savings.

For example: A diesel engine manufacturer asked for a replacement analysis on a 10-year-old boring machine, used to finish the I.D. of cam roller followers. It was found that a Model 322 Bore-Matic, like that shown at the right, would do the same job *50% faster*, with the following annual savings in operating cost:

	Old Machine	New Heald
Parts per hour	187	280
Parts per year (Req'd. Prod.)	374,000	374,000
Direct & Indirect Labor	$17,820	$9,400
Annual Maintenance	$750	$200
Annual Operating Cost	$18,570	$9,600
Annual Saving for New Machine		$8,970



YOU pay for obsolescence. Replacement pays for itself!

THE HEALD MACHINE COMPANY

Subsidiary of The Cincinnati Milling Machine Co.

Worcester 6, Massachusetts

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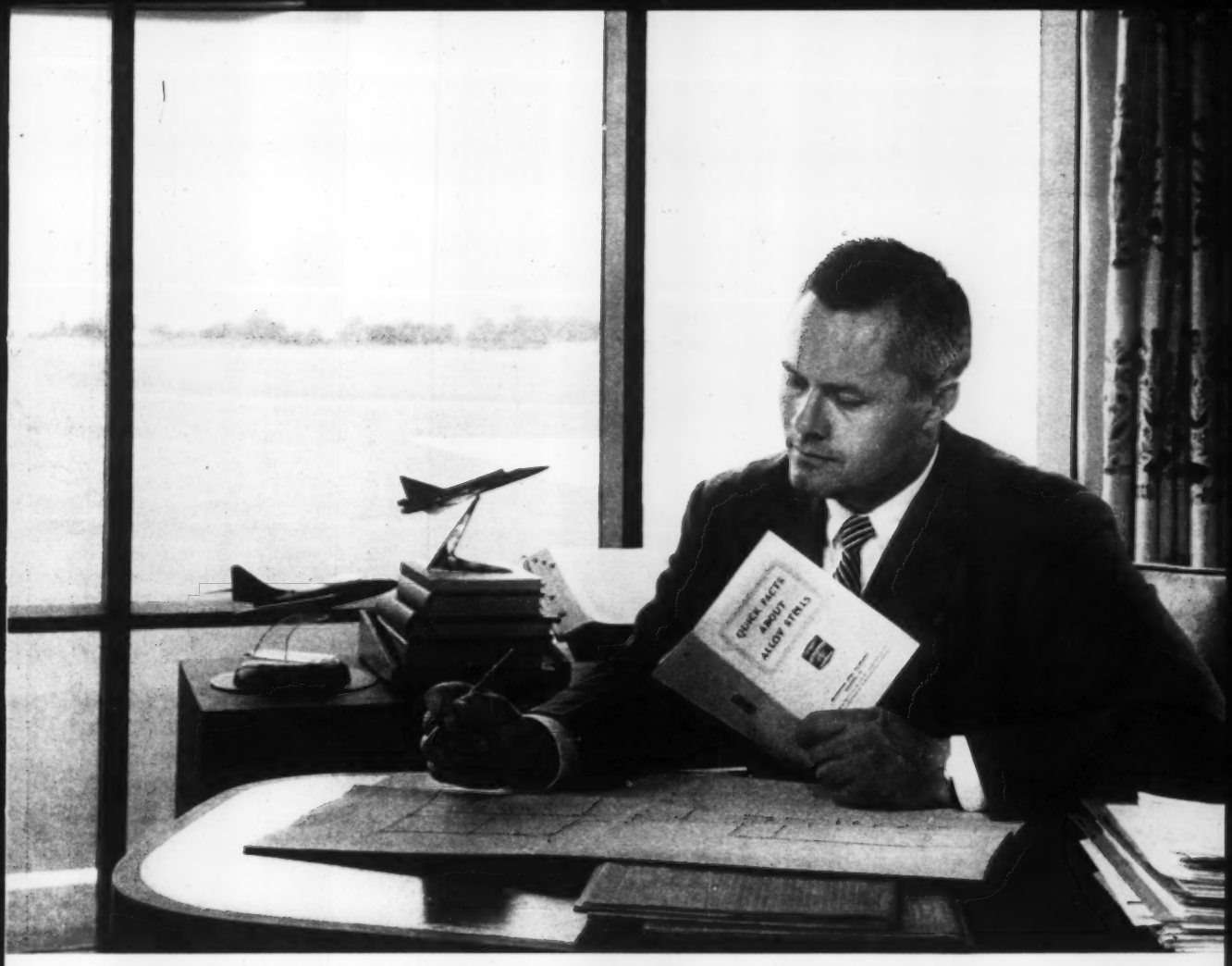
HEALD



The little booklet on alloy steels that grew into a textbook . . .

Quick Facts about Alloy Steels appeared for the first time in 1956, as a collection of reprints of a series of Bethlehem advertisements in metalworking magazines.

The small booklet was well received, and we kept adding more of the informative advertisements as we reprinted it to keep up with demand. Today, it has grown to 40-page size, and is in its Third Edition. More than 20,000 booklets have been distributed at the written request of executives, engineers, designers, and others, who have found *Quick Facts* to be an authoritative small textbook on the fundamentals of alloy steels. Here's what a U. S. Navy engineer wrote:

"*Quick Facts* is a small textbook of information—a booklet that has been needed for a long time. One of my associates and I had a metallurgical problem involving alloy steels. We just didn't have the information. A friend showed me a copy of your booklet *Quick Facts*, and there on one page, under the subject 'Determining Depth Hardness,' was just what we wanted to know!"

The current booklet contains reprints of the complete series of advertisements, on such subjects as, "What is an Alloy Steel?" "Effects of Elements," "Grain Size," "Heat-treatment," "Quenching Media," and others. It's written in concise, layman's language, from data compiled by Bethlehem's metallurgical engineers.

Would you like a copy of the *Quick Facts* booklet? Just fill out and send in the coupon.

PUBLICATIONS DEPARTMENT, ROOM 1030
BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

Please send me your "Quick Facts about Alloy Steels" booklet.

*NAME*_____

*COMPANY*_____

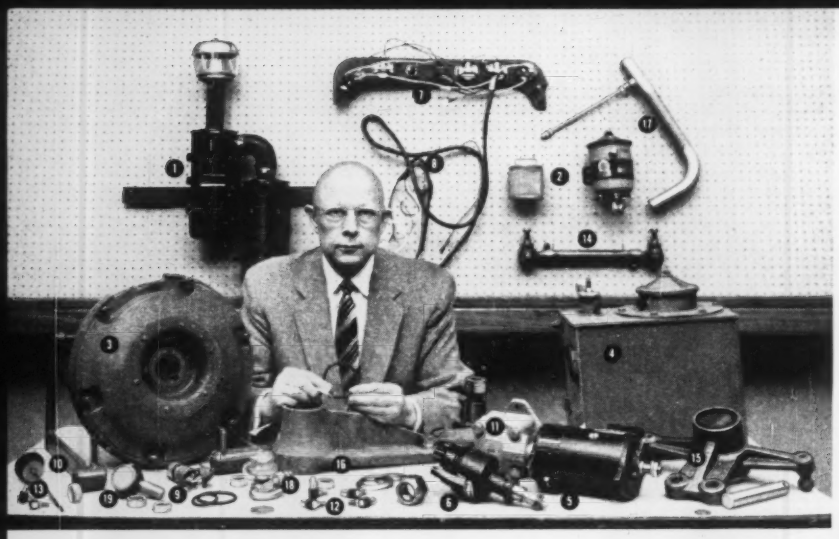
*ADDRESS*_____

*CITY*_____ *STATE*_____

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA. On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL



"Why are so many PROTECTIVE features engineered into the new H-25 PAYLOADER?"

This question is frequently asked of Ralph Beyerstedt, Executive Vice President of The Frank G. Hough Co. because of his more than twenty years of experience in charge of engineering.

"During the development of the H-25," Mr. Beyerstedt explained, "as soon as it became evident that we were going to obtain the increased capacity, production, ease of operation, speed and mobility we sought, our engineers then gave major attention to protective features for operational insurance against wear, maintenance, abuse, downtime and the like.

"The more than 10,000 small HA 'PAYLOADER' tractor-shovels that we have produced for steel mills, foundries and chemical and fertilizer plants operate under conditions which continuously subject the machines to dust, dirt, powder and foreign materials.

"Because these are sources of major headaches for owners and operators," said Mr. Beyerstedt, "we have given extra special consideration to elimination of the problems they cause."

Dozens of Protective Features

"Starting with the *triple* air cleaning system (1) we have provided a precleaner and dual oil-bath air cleaners for engine intake, and crankcase breather tube (17).

"Next, each of the three oil systems is equipped with a cartridge-type oil filter (2). These take care of the engine oil, the hydraulic-system oil, the power-shift transmission and torque-converter oil.

"The self-adjusting, hydraulic service brakes (3) are *sealed* and the parking brake is enclosed in the transmission, operates in oil for greater dependability.

"The reservoir (4) of the closed, pressure-controlled hydraulic system has built-in cartridge-type filter and *sealed* dip-stick."

In discussing the components of the electrical system, Mr. Beyerstedt said, "There is a 12-volt system with the battery grounded direct to the starter housing; a non-vented, *sealed* generator (5); *sealed* ignition distributor (6); shock-mounted instrument panel (7) with solder-coated terminals and a plastic-coated wiring harness (8); *sealed* circuit breaker together with *sealed* ignition and starter switches (9) plus clutch-pressure warning device (18).

"*Sealed* teflon bushings are used extensively throughout with brake and transmission disconnect mechanism (10) and valve control mechanism (11).

"These *sealed* ball joints (12) are used with gearshift linkage and *sealed* ball joints of a different size (13) are used with the accelerator linkage.

"The steering linkage uses *sealed* ball joints on the tie rods (14), and on the drag link (19). The steering bell crank (15) is *sealed*, also the spindle and kingpin assemblies.

"The boom arm mechanism has tapered roller bearings and dust covers on the bell cranks (16) and *sealed* mated bronze and steel bushings plus O-ring seals at all major pivot points."

Now, What About Production?

The carry capacity of the H-25 "PAYLOADER" is 2,500 lbs.—25% greater than has ever before been available in a tractor-shovel of its size and maneuverability, yet it easily loads and unloads box cars with narrow 6-foot doors. It is the only loader in its size range with *complete* power shift transmission—having 2 speed ranges forward and two in reverse. Power-steer is also standard so that operating speed and handling ease favors all-out production all day without operator fatigue.

Other plus features of the H-25 that mean more production, less maintenance and longer life are the exclusive power-transfer differential, wet-sleeve overhead valve engine, full-shift fuel capacity, 4,500 lbs. of bucket breakout force and 40° bucket tip-back at ground level.

Your "PAYLOADER" Distributor wants to show you how the greater capacity, speed and handling ease of the H-25 can cut your bulk-handling costs. Ask him about Hough Purchase and Lease Plans, too. The Frank G. Hough Co., 876 Sunnyside Ave., Libertyville, Ill.

8-A-1

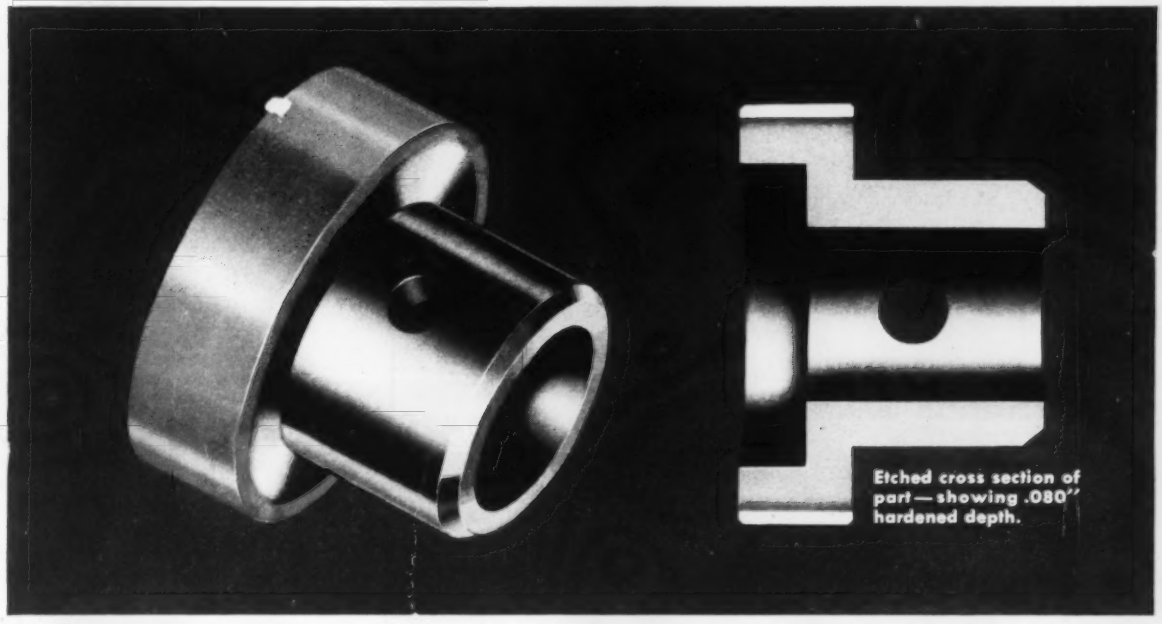
The H-25 "PAYLOADER" is effectively shielded against dust, dirt and foreign materials.

Costs Cut 94%

with

TOCCO* *Induction Heating*

A cost reduction of 94% resulted when heat-treatment of this Corn Harvester part was changed from carburizing to TOCCO-hardening. Look at the unit cost breakdown:



CARBURIZING		TOCCO-*Hardening*	
Degrease	$0.0020	eliminated	
Carburize	0.0200	eliminated	
1st quench	0.0150	TOCCO, heat and quench	$0.0060
2nd quench	0.0150	eliminated	
Draw	0.0050	eliminated (self-draw)	
Shotblast	0.0035	eliminated	
Internal Grind	0.0243	eliminated	
External Grind	0.0166	eliminated	
	$0.1014		$0.0060

"... Savings of 9½ cents per piece — $4770.00 on each 50,000 piece batch, *plus* an hourly production increase from 120 to 300 pieces per hour, plus improved quality of the product by virtue of the deeper case and stronger core."

Have you investigated TOCCO's cost-savings possibilities for your hardening, brazing, melting or forging operations? Why not write us today or send blueprints of your parts — no obligation, of course.

THE OHIO CRANKSHAFT COMPANY

Mail Coupon Today—NEW FREE Bulletin

The Ohio Crankshaft Co. • Dept. S-8, Cleveland 5, Ohio

Please send copy of "Typical Results of TOCCO Induction Hardening and Heat Treating."

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Precision-Tailored Spring Steel

FOR ACCURATE FLATNESS, STRAIGHTNESS, WIDTH, GAUGE AND EDGE FINISH *PLUS* SPECIFIC PHYSICAL PROPERTIES

SS-138

When you require specific physical properties combined with accurate dimensions in spring steel, call Sandvik.

From composition, through processing to the finished strip, Sandvik has had long experience in precision-control. That is why you find Sandvik steels used for feeler gauges, watch springs, compressor valves, camera shutters, reeds, shock absorbers and many other exacting spring steel applications.

Sandvik supplies cold rolled specialty strip steels —

- **In special analyses for specific applications.**
- **Precision-rolled thicknesses to fit your requirements.**
- **In straight carbon and alloy grades.**
- **Annealed, unannealed or hardened and tempered — scaleless or polished bright, yellow or blue.**
- **With square, round or dressed edges.**

Sandvik stocks a wide variety of qualities and sizes. In addition Sandvik has Rolling, Slitting, Edge-Filing and Hardening and Tempering facilities.

NEW, FREE BROCHURE

Gives Specific Data On Sandvik Cold Rolled and Hardened and Tempered Strip Steels. Catalogs leading types by application and lists finish, usual size range and chemistry. Send for your copy today.

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Sandvik Quality Steels

This Week in STEEL The Metalworking Weekly

August 25, 1958
Vol. 143 No. 8

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Walter Reuther has two basic motives: He wants to save face, pave way for profit sharing.

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STEEL, the metalworking weekly, is selectively distributed without charge to qualified management personnel with administrative, production, engineering, or purchasing functions in U. S. metalworking plants employing 20 or more. Those unable to qualify, or those wishing home delivered copies, may purchase copies at these rates: U. S. and possessions and Canada, $10 a year; all other countries, $20 a year; single copies, 50 cents. Metalworking Yearbook issue, $2. Published every Monday and copyright 1958 by Penton Publishing Co., Penton Bldg., Cleveland 13, Ohio. Accepted as controlled circulation publication at Cleveland, Ohio.

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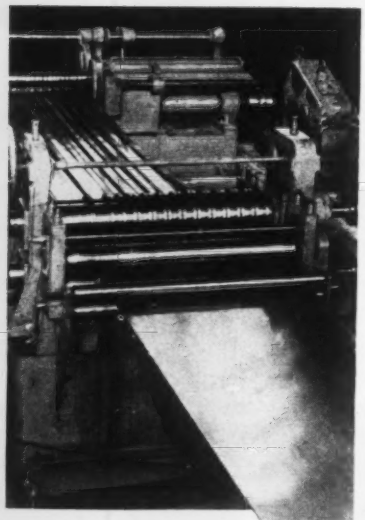


Greater Profit and Operational Flexibility with a YODER SLITTER

Even if you use less than 100 tons of varied strip sizes per month, it will pay you to investigate the savings that are possible through the operation of a Yoder slitter. Savings per ton increase rapidly as coil size and width of strands decrease...so much, that under average operating conditions, a slitter will pay for itself in a few months.

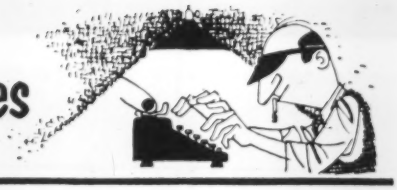
From a small stock of standard mill-width coils, a Yoder slitting line enables you to meet unexpected demands, or to supply "special" width slit strands in a matter of a few hours. This flexible operation increases plant efficiency, resulting in savings of time and money through simplified production planning and greatly reduced strip inventories.

The Yoder line includes slitters of every size and capacity for coil or sheet stock. Send for the all-new, 1958 edition of the Yoder Slitter Book. It is a comprehensive text on the mechanics and economics of slitter operations with time studies, cost analyses, and other valuable data. Write to:

THE YODER COMPANY
5502 Walworth Avenue • Cleveland 2, Ohio

ENGINEERING YODER MANUFACTURING
ROTARY SLITTING LINES

behind the scenes



Bang, Bang in Peking

"You ought to of seen them crazy Orientals in Peking," said Marco Polo to a skeptical buddy in a Venice bar late in 1295. "I was traveling on official business for the Khan, see, and I run into a funeral director. This here mortician was a real gone cat, you know what I mean, and he was messing with some pots of medicine."

"What good is medicine to an undertaker?" interrupted the skeptical buddy. "Offhand, wouldn't you say that, no matter how good it was, it would be a little late?"

"It wasn't to be took internally," explained Marco. "It was just made to be scattered around in the neighborhood of the corpse. You see, it was a mixture of saltpeter, charcoal, and sulfur. It was wrapped up in small rolls of paper, and set on fire. The minute the heat hit the medicine, it flashed like lightning and the noise shook the whole neighborhood. The undertakin' character told me that it was real raunchy stuff for scarin' off daemons."

Exeunt Polo and skeptic, and enter STEEL's Associate Editor Ross Whitehead, followed by an incredulous Shrdlu. Scene is the sixth floor lunchroom 663 years later.

"You should have seen those explosive-forming experts at the National Northern Corp. at West Hanover, Mass.," said Whitehead. "I was traveling on official business for STEEL, you understand, and I ran into Sam J. Porter. Mr. Porter is vice president of National Northern, and an expert on explosives. He was fooling around with some plastic letters, a piece of stainless steel, and a cardboard carton —an ice cream carton, I believe."

"What was a vice president fooling around with stuff like that for? A man could lose his job if that got out."

"He was demonstrating a principle. You see, he placed the flat steel on the plastic letters, filled the carton with water and placed that on the steel, placed an explosive in the water, and we retired to a safe spot. The explosive was detonated, the water and carton flew all to—well, to pieces, and there was the steel with the letters stamped right into it! The shock wave was the gimmick."

Bang, Bang in a Bucket

Marco Polo's skeptical buddy was never more skeptical than Shrdlu, particularly when Whitehead volunteered more background information on his story, "Explosives Form Space Age Shapes," beginning on Page 82.

"That shock wave is so terrific," he explained, "it reproduces every scratch and wrinkle. You could place your face on a steel die block, put a bucket of water on your head, explode a charge in the water, and do you know what?"

"We wouldn't have any face."

"Yes, you would; it would be reproduced perfectly in the solid steel, moles, whiskers, and all. Isn't that amazing?"

Of course it is amazing—almost as amazing as the whole story about explosive forming.

When you read the article, you will be inclined to agree with Copy Editor Harry Chandler: He said the process is bound to do a bang-up job.

Out, Damned Diphthong!

Say, speaking of the copy desk reminds us that gimlet-eyed Chandler killed us with kindness a few weeks ago, in an item headed "Sheweth How One Maketh Iron" (STEEL, Aug. 4, p. 6). When the Encyclopaedia Britannica moved from England to the U. S., the English spelling came with it as part of the deal. That little old diphthong is almost a trademark, and the American publishers of the Encyclopaedia (sic!) cherish it dearly. We spelled it according to their notion, and explained, in a feeble attempt at frivolity, that even when it was right it looked wrong.

Harry figured that if this country had fought a war to emancipate its spelling, he wasn't going to backslide into the cacographic darkness that marked English rule. He corrected the spelling by making it incorrect, and left us to choke on our own words—"even when it's right it looks wrong." Naturally, it wasn't, so it did! This week we set a trap for him: A few lines back we had Marco Polo mention a daemon; what do you want to bet he won't change it to devil?

Let's Have Oodles of Doodles

Simple figuring with a soft pencil on a big scratch pad is sometimes relaxing.

When people are lost in thought and armed with a writing instrument, they frequently make doodles, or supposed meaningless designs. We are making an academic survey of doodles, so we want you to send us all your doodlings executed as you find the value of:

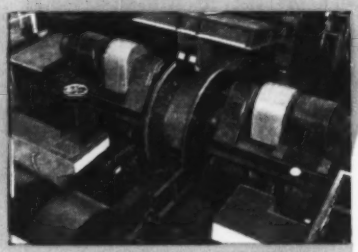
$$\sqrt[3]{\frac{3678^{1} \times 3.257^{2}}{1679^{2.3} \times 1.345^{1.5}}}$$

Shrdlu

(Metalworking Outlook—Page 41)

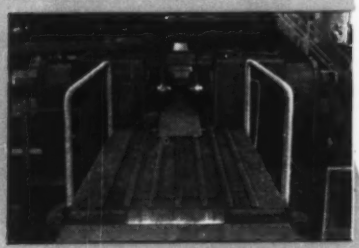
auxiliary equipment *for* ELECTRIC WELD PIPE MILL

All Auxiliary Equipment by "YF&M" except Edge Conditioning by Wheelabrator. Mill Proper by Yoder.



Only 20 seconds required to enter 30,000#, .500" thick x 54" wide Coils from Conveyor into Leveller, using this rugged Cone Type Uncoiler equipped with hydraulically operated Peeler and Coil Opener.

Heavy duty Up-Cut Shear equipped with Fawick Air-Flex Clutch. Shear travels hydraulically and automatically cuts at speeds of 45—180 FPM.



Over Hung Mandrel Type Side Trimmer equipped with eccentric sleeves on both top and bottom arbors to insure best possible edge for welding operation and longer knife life.

Another example of how

"YOUNGSTOWN"

serves the steel industry

This modern mill utilizes "YF&M" Auxiliary Equipment to produce 4½"—16" Dia. Electric Weld Pipe. Material: Hot Rolled Skelp Steel; width: 15"—54"; thickness: .125"—.500"; coil weight: 30,000#; line speed: 45—180 FPM. Advanced design and rugged construction for highest efficiency are features of this mill and its precision equipment.

YOUNGSTOWN Auxiliary Equipment built for this new Pipe Mill

- CONE TYPE UNCOILER
- COIL PEELER
- 7-ROLL ROLLER BEARING LEVELLER
- TRAVELING UP-CUT SHEAR
- SIDE TRIMMER
- SCRAP CHOPPER
- PINCH ROLL STANDS
- TABLES WITH SIDE GUIDES

Whatever your needs we'll be glad to quote, or discuss your problems

The Youngstown Foundry & Machine Co.

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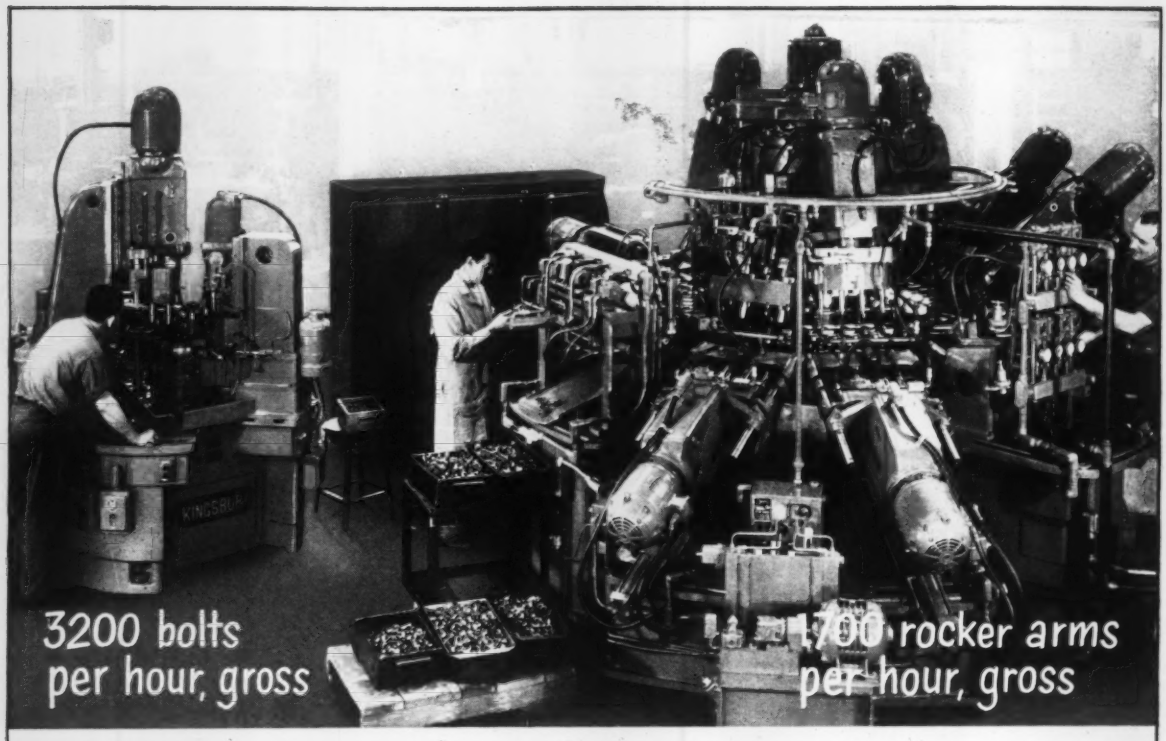
HEAVY MACHINERY • AUXILIARIES • CASTINGS • ROLLS

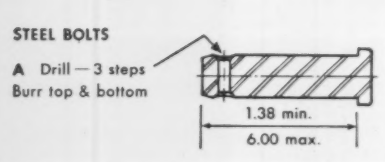
"YF&M" builds the best of them

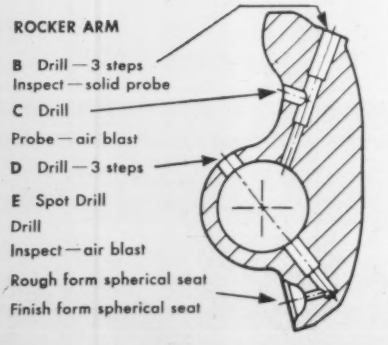


On the left — a ten-spindle Kingsbury. It completes two bolts every 2.2 seconds (including indexing). The big unit has a three-spindle auxiliary head and drills hole A in three steps at three stations. Each small unit has an underneath attachment and burrs one part top and bottom. Parts are ejected onto a chute between these burring units.

On the right — a 56-spindle Kingsbury with center column. It completes four rocker arms every 8.5 seconds (including indexing). All units have four-spindle auxiliary heads with oil mist lubrication. Units on the center column operate on hole B. Units on knees around the base work downward on holes C and D and upward on hole E. The units for hole E have hydraulic slides for more efficient changing of tools.

...talk about high production!





These two Kingsburys have extremely high production rates because they (1) operate on more than one part at a time, (2) have short time cycles by drilling in steps, and (3) automatically clamp, unclamp and eject onto chutes. The machines are on our assembly floor ready to ship. The customers have approved test samples.

One machine is fairly simple, the other complex. But both will continue to produce good parts month after month because they have good basic design and rugged, accurate construction.

LOWER PRODUCTION RATES

Most Kingsburys produce at rates of 200 to 600 parts per hour. We design each one to meet the customer's requirements. On most machines each fixture holds only one part. Many have manual clamping.

For 38 years we have built machines that our customers don't worry about. May we do the same for you? Kingsbury Machine Tool Corporation, Keene, New Hampshire.

KINGSBURY

At Wayne Pump Co.,
Youngstown Seamless Pipe is being closely inspected in a plunger assembly for use on a modern industrial lift.

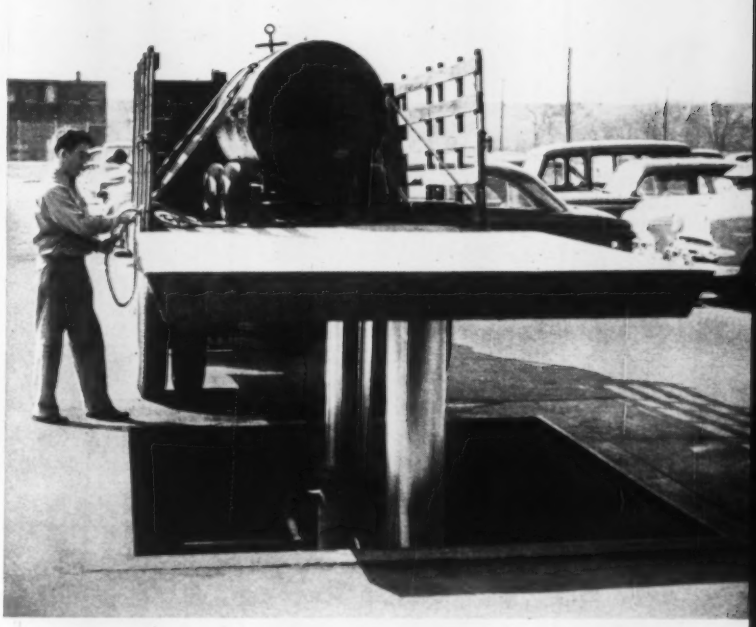
Accent on Excellence

Youngstown seamless pipe

Much of the back-breaking, "man-killing" work of Grandfather's day is a thing of the past—thanks to modern industrial platform lifts such as this installation designed and built by Wayne Pump Company of Fort Wayne, Ind.

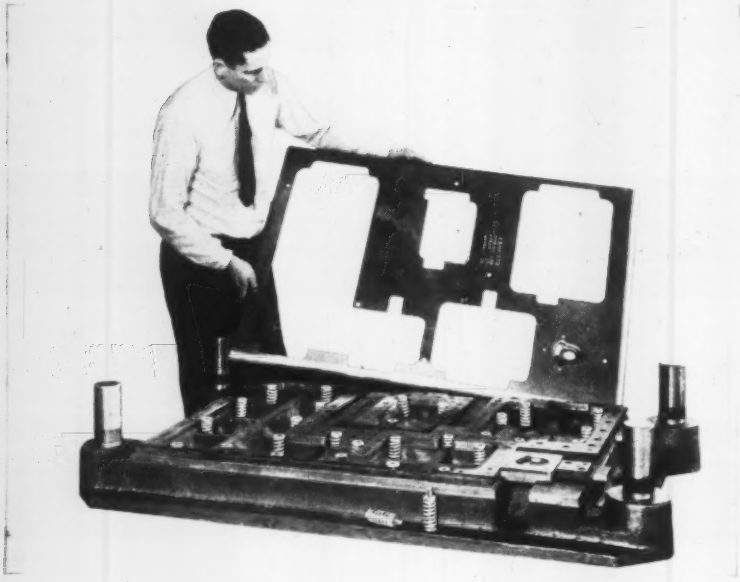
Wayne Pump machines and grinds Youngstown Seamless Pipe to finished size for the all-important plungers that support the lift platform. They report this pipe is ideal for the application due to its "uniform quality and freedom from laminations".

Wherever steel becomes a part of things *you* make, the high standards of Youngstown *quality*, the personal touch in Youngstown *service* will help you create products with an "accent on excellence".



THE
YOUNGSTOWN
SHEET AND TUBE COMPANY

Manufacturers of Carbon, Alloy and Yoloy Steel, Youngstown, Ohio



the **STRIPPIT** that gave us our name...brings you

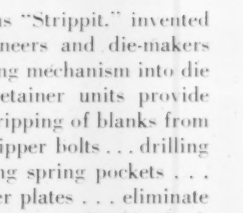
lower tooling costs!

A REVOLUTION IN DIE-MAKING. The famous "Strippit," invented by Wales Strippit Company, saves tool engineers and die-makers endless hours of designing and building stripping mechanism into die sets. These compact, telescoping spring-and-retainer units provide standardized stripping pressures for uniform stripping of blanks from dies. Strippits eliminate spring grinding . . . stripper bolts . . . drilling and counterboring for stripper bolts . . . boring spring pockets . . . permit use of thinner, easier-to-machine stripper plates . . . eliminate turning over the punch holder and die shoe castings after the back sides have been planed. Strippits pay for themselves many times over on every job.

LOWER COST MULTIPLE PIERCING AND NOTCHING.

Strippit self-contained hole punching and notching units, provide the most economical way to notch up to ¼" mild steel and punch flats, structurals and extrusions up to ¾" mild steel. These units are quickly set up in any pattern, placed in the press without loss of press time and actuated by the ram. Interchangeable standard or special tools . . . fast setup changes . . . re-usability of all units . . . give you high production plus flexibility for quick, economical design changes. Write today for complete engineering details and if you desire, a demonstration by a Strippit mobile unit at your plant. No obligation, of course.

Warehouse stocks in Chicago and Los Angeles.



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WALES **STRIPPIT** COMPANY

210 Buell Road, Akron, New York

Manufactured in Canada by Strippit Tool and Machine Limited, Brampton, Ontario

LETTERS TO THE EDITORS

Congratulations on Timeliness

Congratulations on your up-to-date article on new titanium alloys. We appreciate the opportunity of being able to learn about the newest and latest metals developed. I would like several copies of the article, "Titanium Gets Ready for Space Age" (July 14, Page 116).

S. C. Pirkola
Senior Metallurgical Engineer
Nuclear Products-Erco
Division of ACF Industries Inc.
Albuquerque, N. Mex.

Weapons for Hard-Time Selling

Please forward six copies of your article, "Needed: Hard-Time Selling" (Aug. 11, Page 32).

R. D. Oldfield Jr.
Sales Manager
Ohio Screw Products Inc.
Elyria, Ohio

Like a Postgraduate Course

I find your 1958 Program for Management series most profitable reading. I would like two copies each of the articles published so far—one for me and one for my son. This series is in the nature of a postgraduate course in management.

Sydney L. Schultz
Sales Manager
Perfection Burial Vault Co.
Division of Perfection Steel Body Co.
Galion, Ohio

Reader Questions Statements

In your July 21 article, "18 Often Ignored Ways To Cut Costs" (Page 74), I noticed a few statements that were unfamiliar to me.

Please advise how you can use three refrigerator cars for the price of one boxcar on west coast shipments and how shipping goods to Los Angeles that are ultimately destined to San Francisco will show greater economy in routing.

D. A. Dash
Traffic Manager
Monongahela Div.
Combustion Engineering Inc.
Monongahela, Pa.

• *Railroads will issue three dry refrigerator cars in lieu of one boxcar on shipments west if the shipments weigh 60,000 lb and if the cars are all loaded and leave together (but they can go to three separate destinations) Check your local railroad*

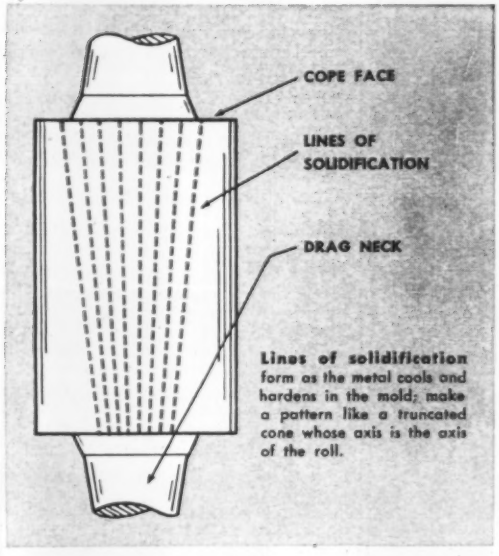
(*Please turn to Page 12*)

TIPS FROM A ROLL MAKER'S NOTEBOOK

MACKINTOSH-HEMPHILL DIVISION, E. W. BLISS COMPANY, Pittsburgh 3, Pennsylvania

Cast mill rolls • Johnston cinder pots • rotary tube straighteners • end-thrust bearings • heavy-duty lathes • steel and special alloy castings

What we learn from "fingerprinting" a back-up roll


COPE FACE
LINES OF SOLIDIFICATION
DRAG NECK
Lines of solidification form as the metal cools and hardens in the mold; make a pattern like a truncated cone whose axis is the axis of the roll.

"Cope face spot depth" sounds a little mysterious, but actually it is a relatively simple, accurate guide to the future performance of back-up rolls in 4-high mills. Even more important, when the roll maker keeps sulfur print records of the spot depth on every back-up roll he ships, it is possible to relate the pattern of the print to the actual tonnage turned out by the roll, as reported by the customer. With this information at hand, Mack-Hemp metallurgists can modify the alloy "mix" or the foundry practice so that the next set of back-up rolls will give even better service.

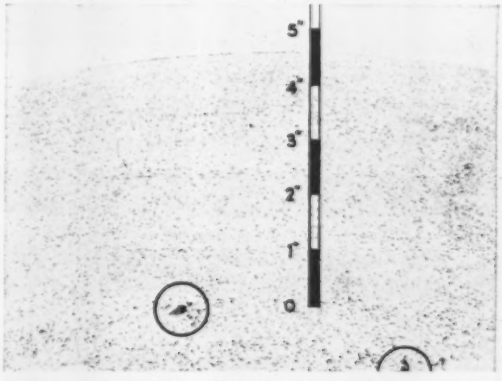
What "cope face spot depth" reveals—As a freshly-poured Mack-Hemp "Technalloy" or "Midland Superalloy" steel back-up roll cools and hardens, so-called "lines of solidification" form below the surface of the roll (see diagram). These lines arrange themselves in a cone-shaped pattern spreading outward as they ascend from the "drag" wabbler toward the upper shoulder of the roll body, or "cope face." The points where the lines of solidification end in the cope face can be detected by an acid etch, and a permanent record made by laying special photographic paper over the etched area.

As you can see, the depth of this zone of dense metal is shallowest at the cope face because of the way the lines angle outward. Hence, cope face spot depth provides a measure of the minimum amount of sound, homogeneous metal between these lines of solidification and the work surface of the roll.

Spots should be deep—In general, the roll maker's objective is to keep the spots on the cope face as deep as possible below the worn-out circumference of the roll. However, sheer depth is not the only indication of the roll's life expectancy and behavior in service. The arrangement and density of the spots also tell their story to the trained metallurgist, particularly when he studies them in the light of performance data from the customer and foundry practice at Mack-Hemp.

* * *

You can see why it's a good idea to keep careful records of tonnages rolled by your Mack-Hemp hot and cold mill back-up rolls. It's a good idea, too, to consult Mack-Hemp on any and all your problems of roll use and selection whenever they arise. Feel free to call or write us at any time.



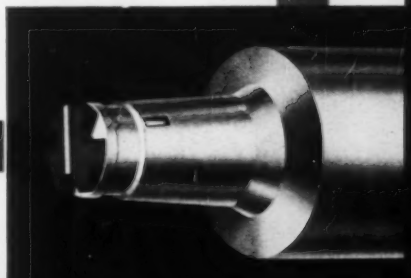
Sulfur print of "Superalloy" back-up roll. Two spots are clearly evident at the bottom of the print (⅓ actual size).

MACKINTOSH-HEMPHILL

You get more tonnage from the rolls with the Striped Red Wabblers

Division of E. W. BLISS COMPANY

Presses, Rolling Mills, Special Machinery



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CINCINNATI Royal Drills are built in 16" and 18" sizes in bench, floor and multiple spindle models. Call in your CL&T Dealer. Or, write us direct.

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"SPIROPOINT" Drill Sharpener

LETTERS

(*Concluded from Page 10*)

traffic man for full details.

With shipments that are less than carload, it is cheaper to make up a carload shipment for the coast and send it to one central point (rather than breaking up the loads into less than carload shipments to several west coast points). If time is important, however, this method would not be effective since it does take longer.

Article Is Timely

I would appreciate receiving six copies of the Program for Management article, "Finding Out What Customers Will Buy (July 14, Page 101). It is timely and will be useful to us in our programing.

W. H. McGlade
Assistant to the Executive Vice President
LeTourneau-Westinghouse Co.
Subsidiary of Westinghouse Air Brake Co.
Peoria, Ill.

Chart Interests Rod Supplier

In May, there was a chart in a STEEL article showing various alloys now being used in missiles and aircraft and other alloys that are proposed. If the charts are still available, would you please send us one? We are furnishing rods for the hot-work type tool steels and find the chart most interesting.

Pat S. Doyen
General Sales Manager
Welding Equipment & Supply Co.
Detroit

• *The article, "Preview of Space Age Metals" (May 5, Page 86), is being sent.*

Aircraft Firms Peenform Wings

On Page 68 of the July 7 issue, there appears the article, "Steel Shot Blasts Panel Contour." I would appreciate a copy, marked for my personal attention.

V. H. Hiers
Senior Product Engineer
Research & Development Div.
Hamilton Mfg. Co.
Two Rivers, Wis.

Cleveland Firm Cuts Costs

Please send us 12 copies of the article, "Automation Between Machines Nets Us $38,436 a Year" (July 14, Page 112).

A. F. Schroeder
Manufacturing Co-ordinator
Transmission & Axle Div.
Rockwell-Standard Corp.
Detroit

New Bonderite Treatment

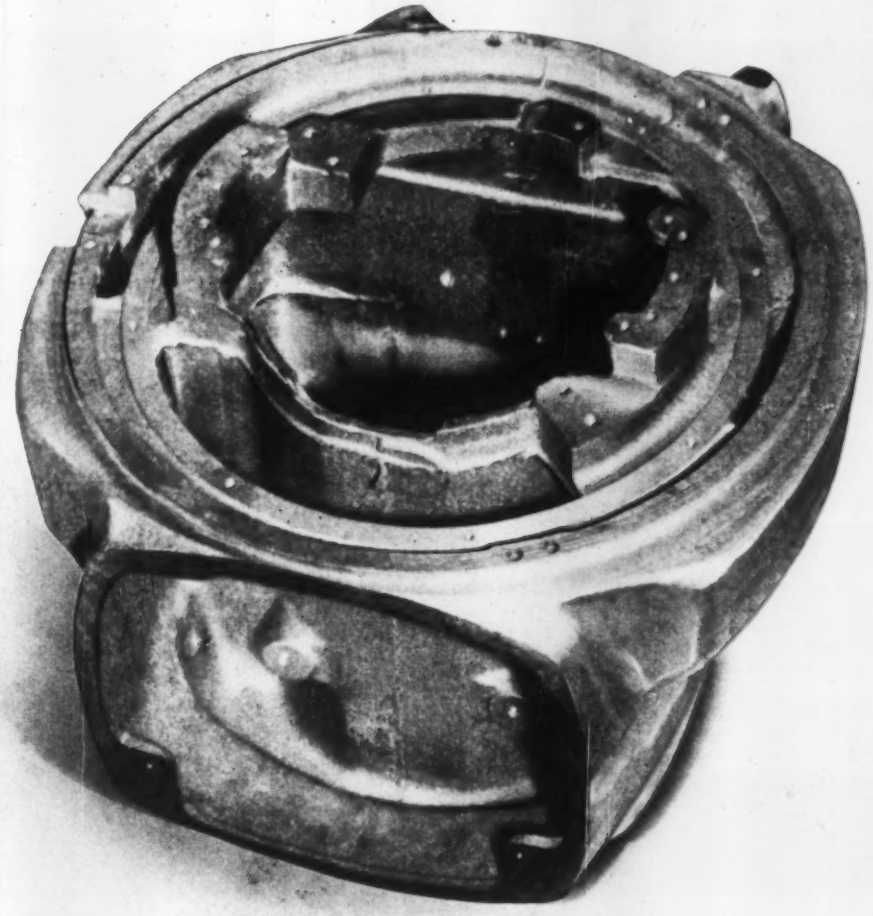
Please forward information on the source of your item, "Cold Bonderite," which appeared in the Technical Outlook column of May 19 (Page 135).

Dana L. Griffee
Manufacturing Engineer
Manufacturing Unit
International General Electric Co.
New York

• *Contact R. W. Englehart, President, Parker Rust Proof Co., 2177 E. Milwaukee Ave., Detroit 11, Mich.*

Pay less for more strength! Tenzaloy the self-aging aluminum alloy needs no heat treatment! If your aluminum castings are too large or too intricate for heat treatment, if your heat treating facilities are limited, if you need superior strength than you get from ordinary heat-treated alloy demand "Federated Tenzaloy" developed by Federated to meet the need for a superior aluminum alloy that ages at room temperature. Tenzaloy eliminates rejects due to warpage, expansion, and internal stresses caused by quenching. Tenzaloy finished properties are stable, proved by conclusive test data over a ten year period. No special foundry techniques are required. No fluxes. Castability is excellent with sand cast and plaster molds and many permanent molds. Tenzaloy will not "grow," produces corrosion-resistant castings with excellent polishing characteristics and anodizes clear white. Write for Tenzaloy Bulletin No. 103. Federated Metals Division, 120 Broadway, New York 5. In Canada: Federated Metals Canada, Ltd., Toronto and Montreal.

FEDERATED METALS DIVISION OF

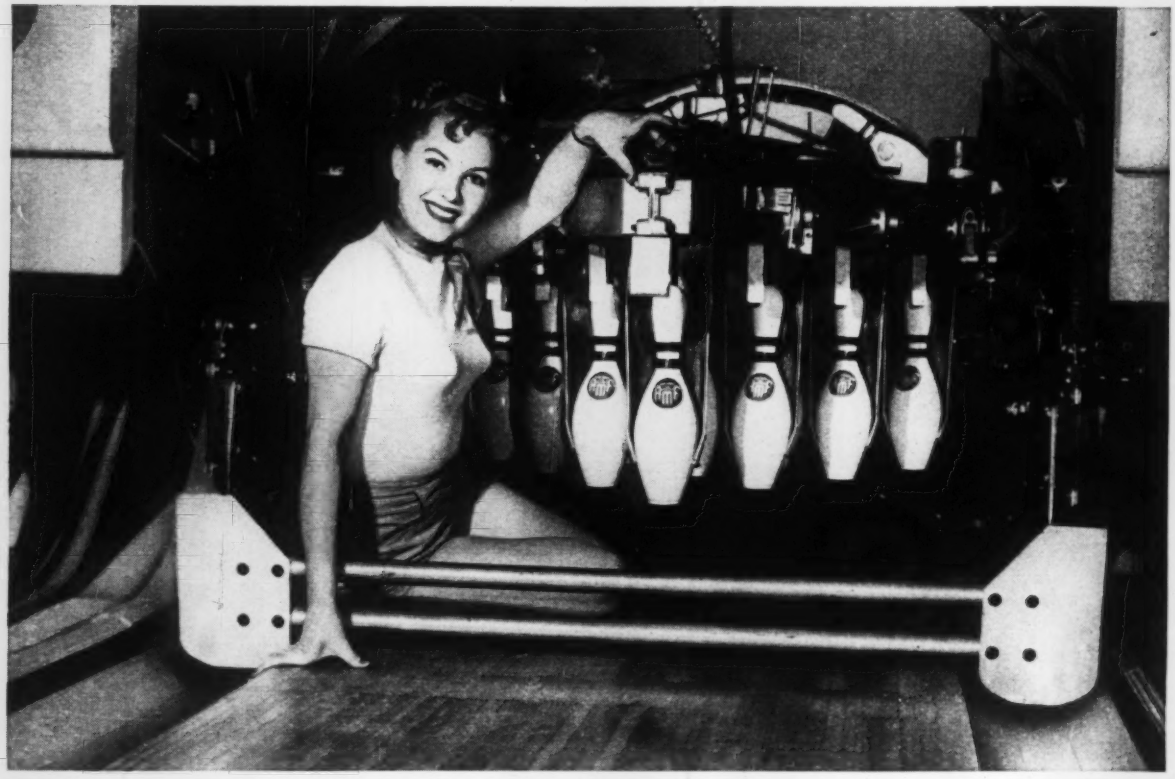


ASARCO

AMERICAN SMELTING AND REFINING COMPANY

TENZALOY is one of a complete series of Federated aluminum casting alloys. A new plant in Alton, Ill. will soon be in production to satisfy the requirements for Tenzaloy in the mid-west.

58-28



Republic ELECTRUNITE Mechanical Tubing is used in four locations across the top of the automatic apparatus that picks up and sets the bowling pins in place. The AMF Automatic Pinspotter is manufactured by the American Machine & Foundry Company, Brooklyn, New York

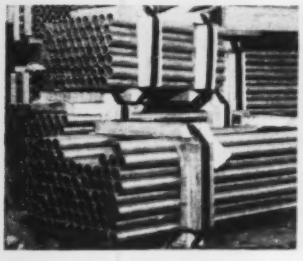
AMF . . . builds a better pinspotter for better bowling with Republic ELECTRUNITE Mechanical Tubing

On the initial order, Republic ELECTRUNITE® Mechanical Tubing saved American Machine & Foundry Company $34,000 in manufacturing their famous AMF Automatic Pinspotter.

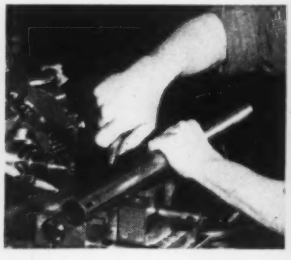
AMF had been using tubing that required a boring operation on each end of the tube and centerless grinding on the O.D.

Because Republic's ELECTRUNITE Mechanical Tubing met AMF's O.D. tolerance requirements, the company was able to eliminate the boring and grinding operations. This resulted in a savings of $15,000 in fabricating operations. Another $19,000 was saved on the cost of ELECTRUNITE as compared with the tubing used previously.

In uniformity and quality, in fabricating, in original costs, Republic's ELECTRUNITE Mechanical Tubing can save you time and money, too! Call your Republic representative, or write today.

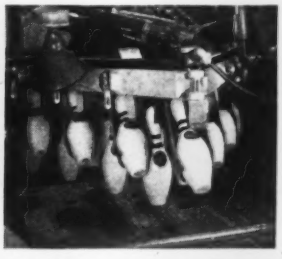


Republic ELECTRUNITE Mechanical Tubing is delivered, cut to length, ready for fabricating. ELECTRUNITE Tubing is "electrically welded" resulting in built-in uniformity.



Slots to hold spotting cups in place are cut into ELECTRUNITE Tubing by machine. Concentricity of the ELECTRUNITE assures easy fabrication and smooth mechanical operation.

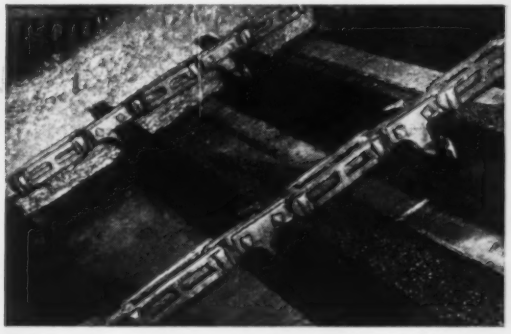
Drilling and cutting complete, the ELECTRUNITE Tubing is ready for assembly. Lightweight ELECTRUNITE offers uniform wall thickness, strength, ductility for greater serviceability.



Sensitivity in setting off-spot pins is the result of design and engineering, highest quality workmanship, and highest quality materials, such as Republic's ELECTRUNITE Tubing.

REPUBLIC NYLOK® FASTENERS SAFEGUARD PERFORMANCE SPECIFICATIONS. Republic fasteners are used extensively on Gemco Rotary, Reel, and Riding Power Lawn Mowers. Inset shows blade assembly securely locked to engine shaft with Nylok Cap Screw. An added advantage of Republic Nylok Bolts and Cap Screws is their ability to seal against fluid escape when wrenched tight. Nylon pellet in bolt body blocks flow of fluid along helical threaded path. Send for data.

REPUBLIC MANUFACTURERS' COARSE WIRE to meet every production need. Box Binding and Stapling, Brush Handle, Chain, Garment Hanger are only a few of the qualities regularly produced. Large tonnages are shipped to manufacturers of fan guards, wire partitions, concrete reinforcing specialties, plated shelves, racks and grilles, and numerous other products. Republic wire metallurgists are available to help you in solving production problems. Write today.



REPUBLIC HIGH STRENGTH STEEL IMPROVES SERVICE LIFE for many types of equipment. In the bottom of this conveyor, for example, it provides excellent resistance to abrasion and corrosion. Far less frequent replacement is required as compared with a bottom made of ordinary steel. And, its high strength-to-weight ratio allows use of lighter gages. Send for details.

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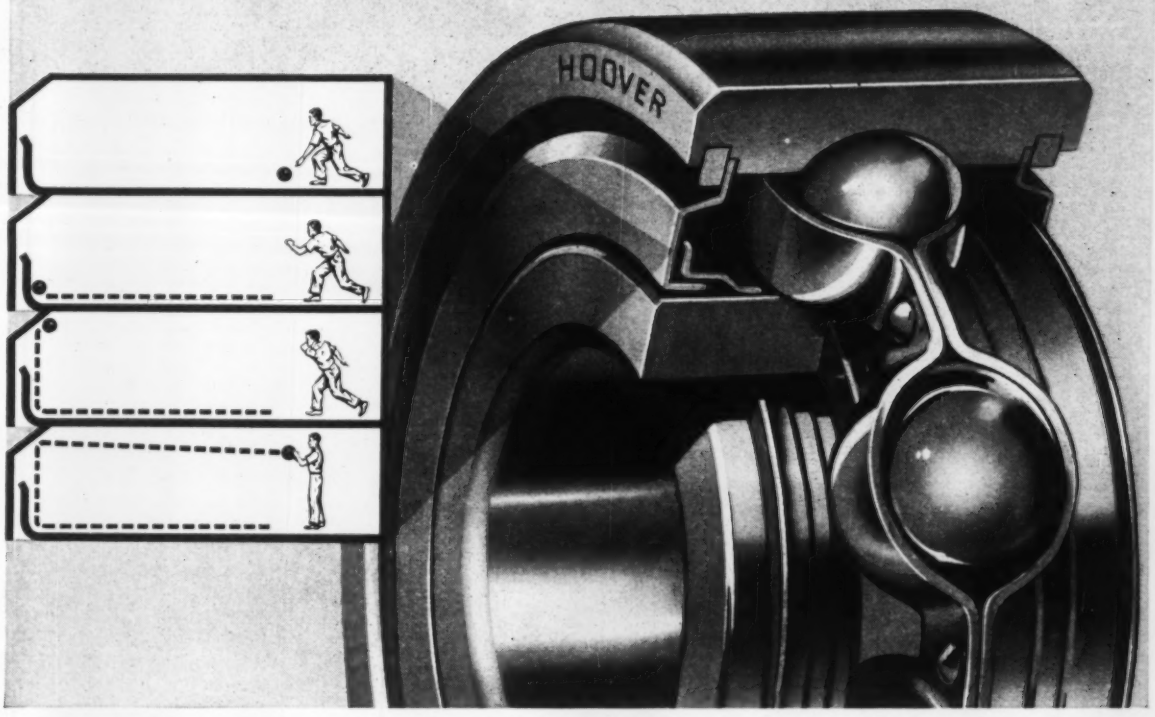

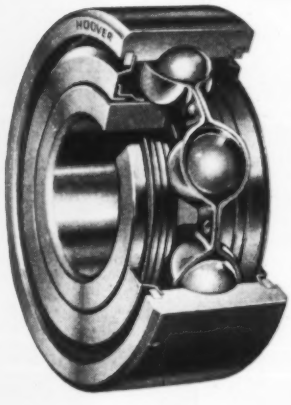

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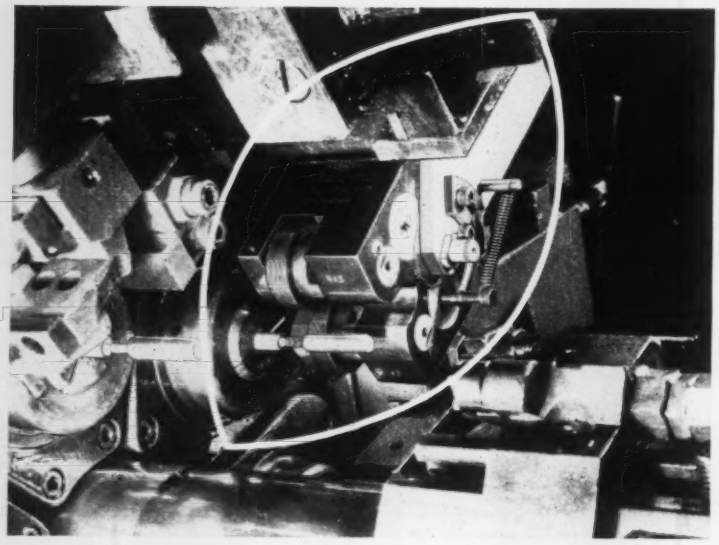
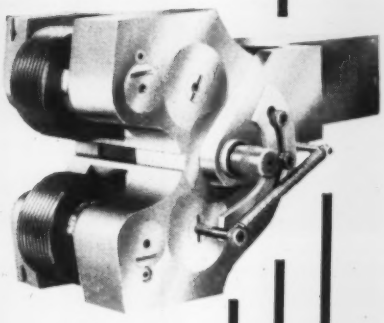




Over 1,100,000 threads with 1 set of Rolls

The economy of LANDIS Thread Rolling Attachments due to long roll life is being demonstrated in the production of studs at the M & S Morenci Corporation in Morenci, Michigan.

#10-32 pitch NF threads, .350" long, are rolled on 1020 screw stock using a #14 GA LANROLL Attachment on a 9/16" Acme-Gridley Automatic. The Attachment is operated in the 4th position, rolling next to the collet .030" back of the shoulder, and threads are held to a Class 2 fit. 1,100,000 threads have been produced to date with the original set of roll dies. Another Lanroll Attachment later placed in operation on the same job has to date produced 500,000 threads with its original rolls.

This long roll life is a result of the basic design of the Lanroll Attachment incorporating patented new principles. A degree of stabilization never before obtained in a tool of this type is ensured between the workpiece and the attachment. Open construction allows the use of thread rolls of the maximum diameter, distributing wear over an increased area. The accuracy and wear-resistance of the rolls themselves is the result of more than 50 years experience in the manufacture of threading tools. These rolls are precision-ground to produce uniform, accurate threads of the highest quality.

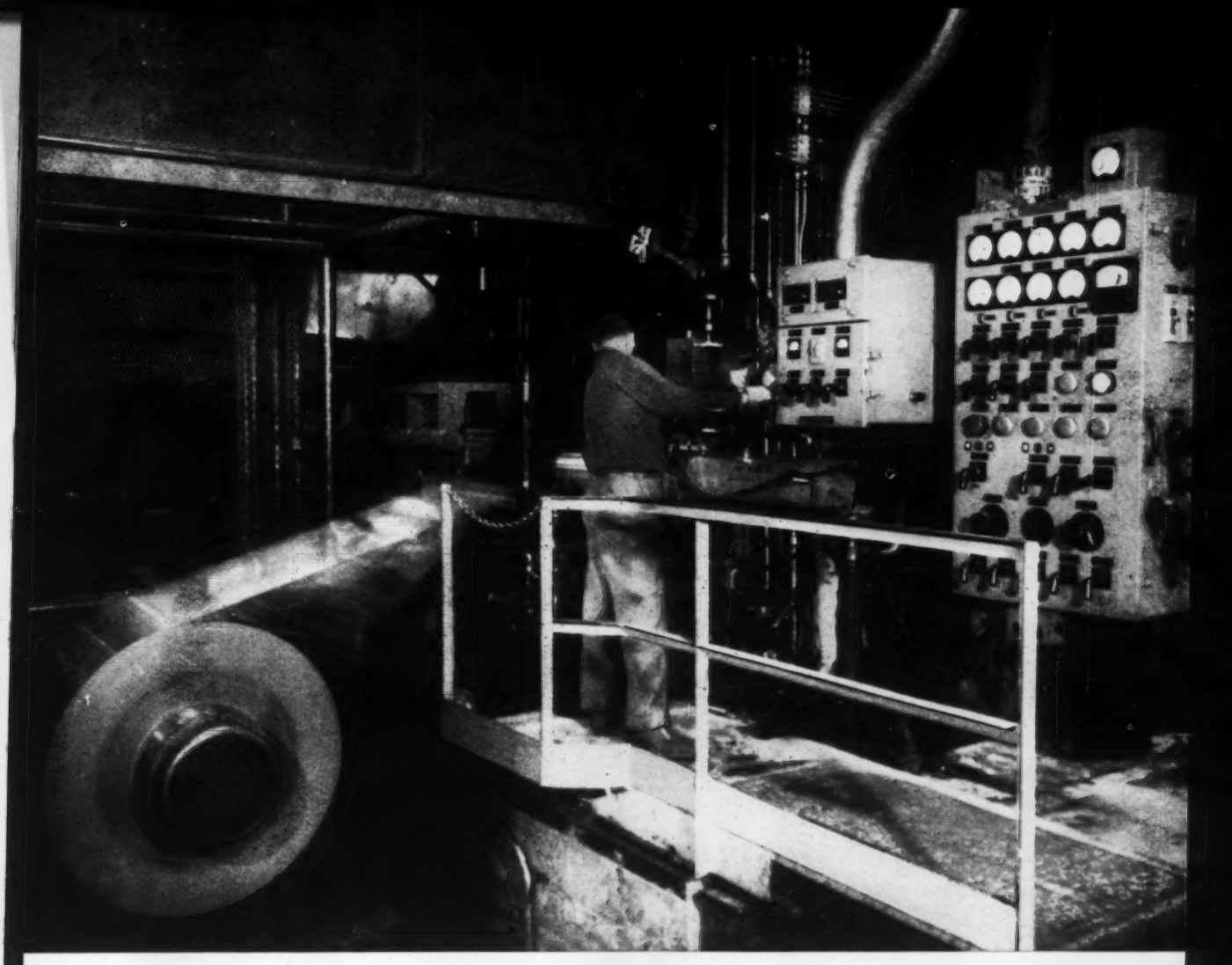
LANROLL Attachments are made in five sizes for use on bar automatics and turret lathes to roll both fine and coarse pitch threads to Class 4 tolerances. Quick and easy set-up changes assure operation of the attachment for every size within its range as though it were exclusively engineered for the particular work being threaded. The M & S operation shown here is an example of this set-up simplicity. Using only the handbook furnished with the Attachment, a satisfactory production set-up was made by a set-up man with no previous thread-rolling experience.

For more detailed information on construction and many exclusive features, send specifications and ask for Bulletin G-96.

LANDIS *Machine* COMPANY

WAYNESBORO • PENNSYLVANIA • U. S. A.

451



J-96121-1

AT 6000 FEET PER MINUTE...

Westinghouse Automatic Gauge Control on Wheeling Steel's New Tin Plate Mill Assures Plus/Minus .0001 Tolerances

In December, 1957, the new five-stand, 6000-fpm, tandem tin plate mill was officially put in service at Wheeling Steel Corporation's Yorkville, Ohio plant. The new 48" mill has 22,500-hp total drive capacity to produce tin plate and heavier strip at speeds up to 6000 fpm.

Westinghouse equipment is used, entirely, to Power-Up this modern installation. One of the most outstanding new developments utilized is the Automatic Gauge Control, designed and furnished by Westinghouse—a practical necessity on a high-speed mill of this type.

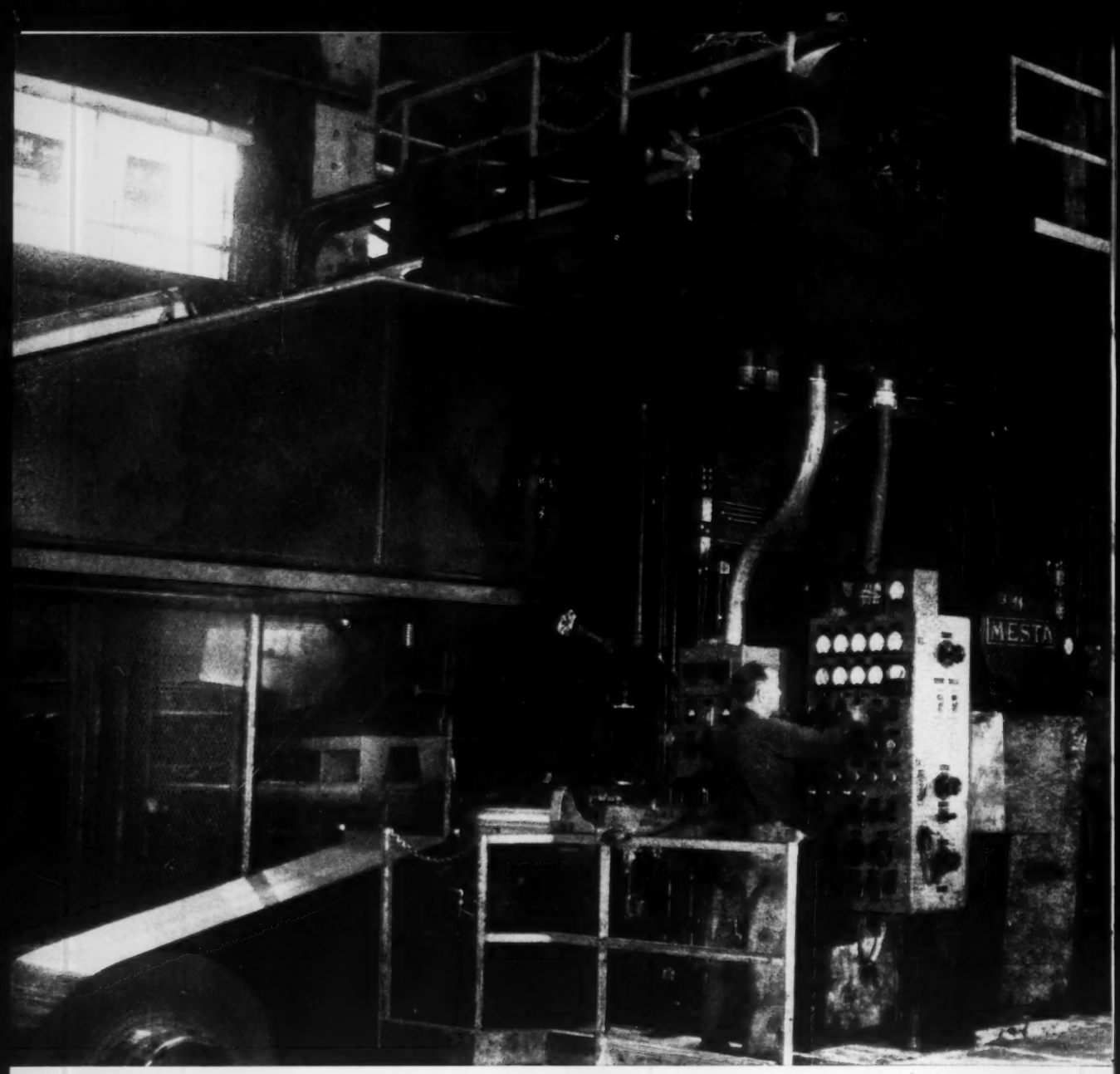
Other Westinghouse equipment furnished for this installation at Wheeling includes: main drive and all auxiliary motors, Magamp* regulators for main drive and variable voltage screwdown controls, M-G sets, brakes, outdoor substations, switchgear, power center, and control centers.

From planning to design, installation and start-up . . . Westinghouse can help you Power-Up. Consult your Westinghouse sales engineer for complete information. Or, write Westinghouse Electric Corporation, 3 Gateway Center, P.O. Box 868, Pittsburgh 30, Pennsylvania.

*Trade-Mark

YOU CAN BE SURE...IF IT'S Westinghouse

Westinghouse Equipment Is Used Throughout the New Five-Stand Tandem Mill at Wheeling Steel Corporation's Yorkville Plant.



New Mill With Automatic Gauge Control Gives More Usable Strip From Every Coil--- Less Production Time Loss

With the automatic gauge control, strip thickness is continually gauged and recorded. Through feedback of signals, the mill automatically adjusts for any variation. Gauge control starts at #1 Stand, controlling the #1 Screwdown to minimize incoming variations. It thereby assures a uniform strip continuously to the mill.

The gauge control at #5 Stand controls the #5 Stand and the reel to adjust the strip tensions and maintain constant gauge of finished strip. The use of this new gauge control assures continuing close tolerance (to within plus/minus .0001) without production slowdown or unnecessary interruption.

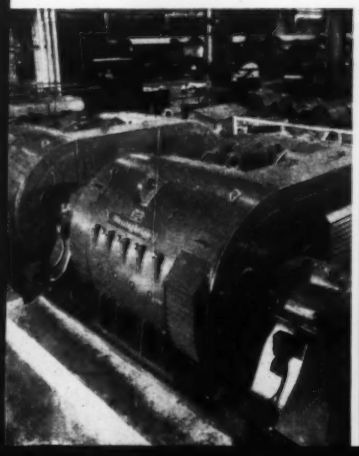
YOU CAN BE SURE...IF IT'S Westinghouse

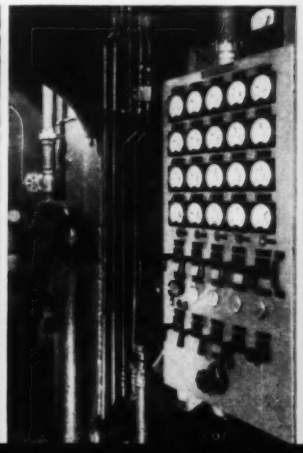
Two 3000-hp double armature motors for #5 Stand twin drive. Side-by-side mounting conserves floor space.

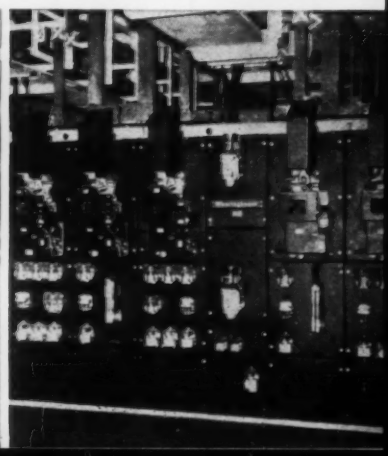
Tensiometer between stands shows strip tensions to guide operators in control of mill, and Westinghouse circular scale meters give maximum readability in minimum panel space.

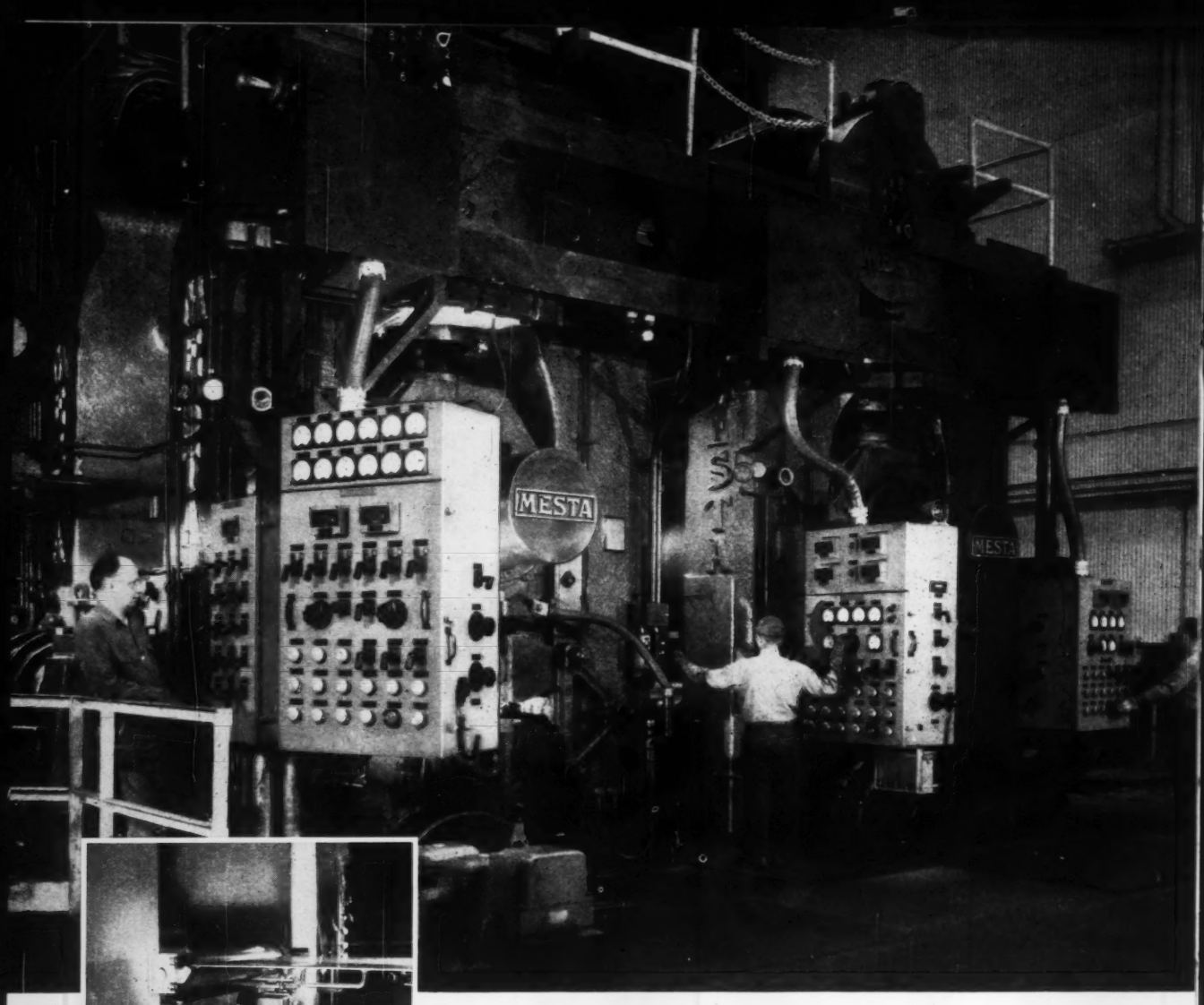
View of motor room showing main and screwdown M-G sets, switchgear and power center. Controls located on balcony at right.

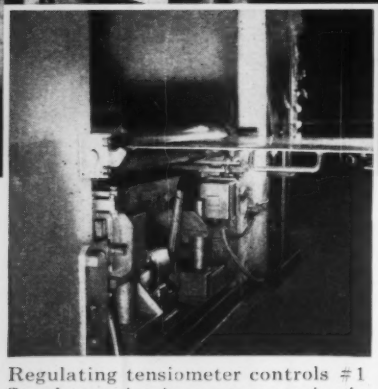
#5 Stand motor and generator line control panels. All circuit breaker and dynamic braking panels are located in basement.





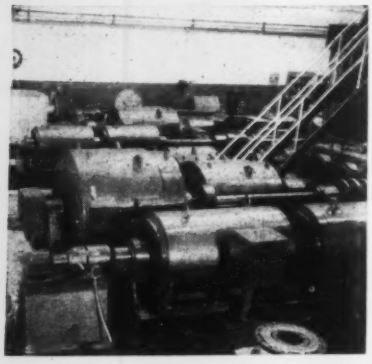






Regulating tensiometer controls #1 Stand to maintain constant tension in strip between stands 1 and 2.

Temper mill main drives. The entry and delivery tension roll twin drives feature special small-diameter machines to enable direct coupling to rolls on 20" vertical centers.



Westinghouse-Powered Temper Mill at Wheeling Gives Higher Tonnage—Less Scrap

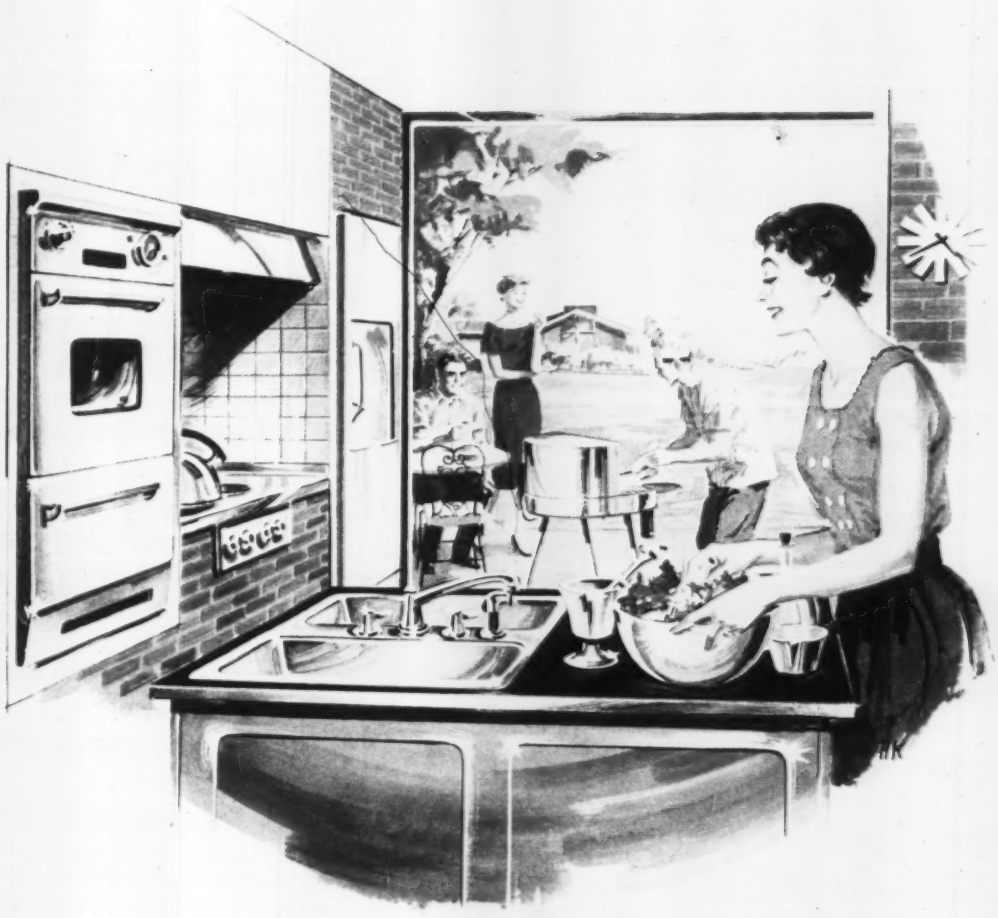
As part of their Power-Up program, the Wheeling Steel Corporation recently installed a new 48" two-stand temper-pass mill, rated at 5000 fpm, equipped with 4600 total horsepower.

This Westinghouse equipped mill has increased the amount of strip produced as well as guaranteeing a better product because of the improved control possible.

Westinghouse equipment furnished includes: main drive and auxiliary motors, M-G set, switchgear, control centers and operating controls.

J-96121-4

YOU CAN BE SURE...IF IT'S Westinghouse



There is no substitute for stainless steel

in homes and home products

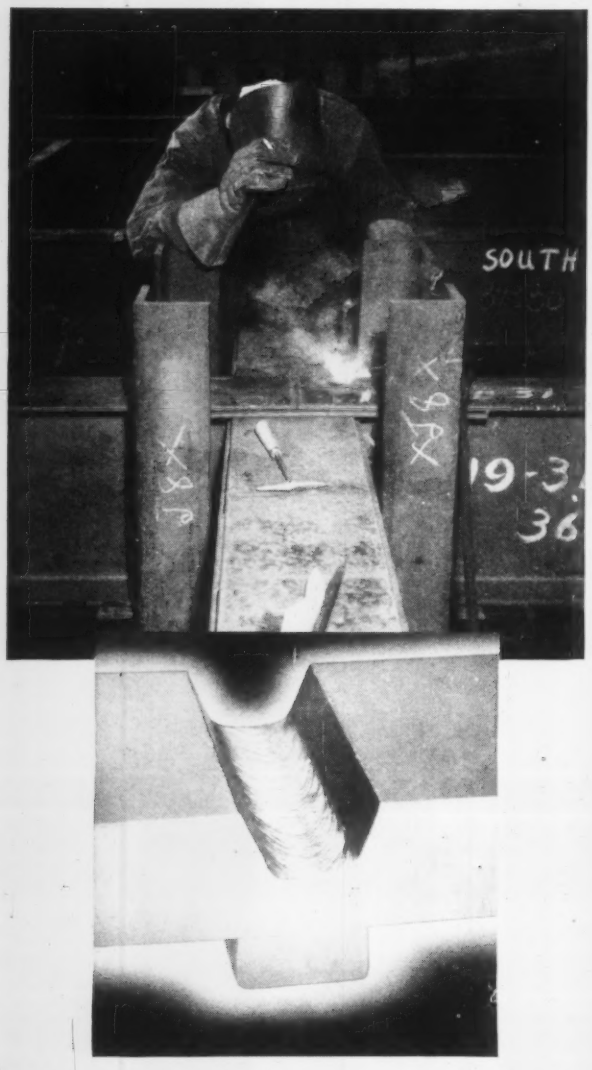
For the lady in the kitchen or the "chef" at the outdoor grill, there is nothing like the gleaming efficiency of Stainless Steel. Everything made of Stainless Steel has lasting beauty and is so easy to keep clean. No other metal contributes so much to better living.

Specify McLouth high quality sheet and strip Stainless Steel. McLouth Steel Corporation, Detroit 17, Michigan.

McLOUTH STAINLESS STEEL

Weldynamics

ARC WELDING AT WORK CUTTING COSTS



A special Jetweld for deep groove welds

Jetweld 2 is a special electrode designed particularly for groove welding. The high deposition rate gives maximum speed in fabrication. The excellent wash-up characteristic and complete freedom from undercut makes the slag easy to remove. Deposits are uniformly of X-ray quality.

No electrode gives faster welding and lower cleaning time. Try Jetweld 2 in your shop.

Lincoln men, trained in Weldynamics, will help you select the best electrode, machine and procedures for lowest welding costs.

Write for Bulletin 7000.1, New Weldirectory of Lincoln Mild Steel Electrodes.

The World's Largest Manufacturer of Arc Welding Equipment

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THE LINCOLN ELECTRIC COMPANY, DEPT. 1043, CLEVELAND 17, OHIO

a revolutionary advancement in Flaw Detection...

Proved by over seven years of extensive use in industry

IMMUNOL 438

REG. U.S. PAT. OFF.

The Non-Destructive Method of Detecting Flaws in Metals **Using Oil Soluble or Water Soluble Pastes**

The U.S. Air Force has recently approved the suspendable method of magnetic inspection if a suitable rust inhibitor and wetting agent is used. IMMUNOL 438 was the product that was approved.

IMMUNOL 438 allows the use of water as a vehicle for dispersing oil soluble and water soluble pastes and it replaces kerosene or mineral spirits in magnetic inspection to safely reduce your costs and speed production. *It has been widely used for over 7 years in industry with outstanding results.*

USE
IMMUNOL 438
It Offers These Important Benefits . . .

- **Cleans Metal** • **Reduces Costs**
- **Eliminates Hazards of Fire, Skin Infection**
- **Eliminates Rust** • **Improves Definition**
- **Is Odorless . . . Non-Toxic**

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PROVED AT 3 STEEL PLANTS

Koppers phenol

removal process

. . . 98.8%+ efficiency
. . . less caustic required

Three coke plants, two in the Chicago area and one in the Buffalo district, recently installed new Koppers dephenolizing systems. At each of these three plants, the Koppers process is removing in excess of 98% of the phenol from ammonia liquor.

NEW DESIGN—Koppers engineers have used Koch-Kascade towers for the counter-current contact of liquor and light oil. Such a design provides intimate mixing of the gently moving fluids . . . with a very high degree of phenol extraction. One coke plant using the Koppers process has been treating an average of 88,000 gal. per day of crude ammonia liquor. The phenol content has averaged 1,792 ppm for the crude liquor and 21.3 ppm for the treated liquor. The average dephenolization efficiency has been a whopping 98.8%! *And, in its first full year of operation, this plant used an average of only 0.61 pounds of caustic per pound of phenol removed.* What's more, the new Koch-Kascade contact towers have no moving parts to be maintained.

Improved design and construction of effluent-treating equipment is but a small part of Koppers vast service to the steel industry. We have 50 years of engineering and construction experience, and have designed and built nearly every type of steel-plant installation. If you're planning to build or expand—call on Koppers.

Pickle liquor treatment plants are designed and constructed by Koppers. A lime neutralization plant built recently by Koppers is shown above. For larger pickling installations, Koppers offers a regenerative process to eliminate the waste stream and recover the sulfuric acid for re-use.

Blast furnaces are designed and constructed by the Freyn Department of Koppers. 96 blast furnaces by Freyn are now in operation throughout the world, with a total annual capacity of more than 27 million net tons.

Koppers-Becker Underjet Coke Ovens feature waste-gas recirculation, precise combustion control and super-efficient heating design. 19,381 of these ovens have been installed by Koppers in the Western Hemisphere.

KOPPERS

KOPPERS

YEARS OF ENGINEERING AND CONSTRUCTION SERVICE

1908···1958

MAKE IT BETTER WITH METALS ..FOR LESS

Visit the METAL SHOW

CLEVELAND PUBLIC HALL

October 27-31

You can do it better with metals . . . for less, if you are up-to-the-minute on your metals know-how and know-why. Competition calls for the most efficient use of metals, equipment, processes . . . for correct design applications.

You can meet this challenge by attending the Cleveland Metal Show and Congress. You will see hundreds of operating production-saving displays. Metals, fabrication techniques, processing methods, testing and inspection — all these and more will be assembled in the vast Public Hall for your convenient inspection.

You will want to hear the scores of technical and practical sessions that ASM and the cooperating groups will present, featuring experts on new achievements in metals. In short, this is *your* event of the year in metals . . . you will use the ideas you pick up at the Metal Show all year long to save time and money for you and your firm.

Exhibitors: excellent space locations in this great "Metals Will Make It Better . . . for Less" Metal Show are available now — write or wire for details.

NATIONAL METAL CONGRESS and EXPOSITION

Owned and Operated by the AMERICAN SOCIETY for METALS

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Cooperating Activities: Institute of Metals Division . . . Iron and Steel Division . . . Extractive Metallurgy Division of the American Institute of Mining, Metallurgical and Petroleum Engineers . . . Society for Nondestructive Testing, Inc. Associations presenting technical sessions in cooperation with ASM: Industrial Heating Equipment Association; Metal Powder Industries Federation; Metal Treating Institute; Special Libraries Association, Metals Division; and the extensive programs of the American Society for Metals with the new Bill Woodside Memorial Sessions, and ASM Metallurgical Seminar.

CALENDAR
OF MEETINGS

Sept. 7-12, American Chemical Society: National chemical exposition and conference, International Amphitheatre, Chicago. Society's address: 1155 16th St. N.W., Washington 6, D. C. Executive secretary: Alden H. Emery.

Sept. 8-11, Society of Automotive Engineers: Farm, construction, and industrial machinery meeting, production forum and engineering display, Milwaukee Auditorium, Milwaukee. Society's address: 485 Lexington Ave., New York 17, N. Y. Secretary: John A. C. Warner.

Sept. 10-11, American Die Casting Institute: Annual meeting, Edgewater Beach Hotel, Chicago. Institute's address: 366 Madison Ave., New York 17, N. Y. Secretary: David Laine.

Sept. 11-12, Refractories Institute: Fall meeting, Broadmoor Hotel, Colorado Springs, Colo. Institute's address: 1801 First National Bank Bldg., Pittsburgh 22, Pa. Executive secretary: Avery C. Newton.

Sept. 14-19, Instrument Society of America: Annual instrument-automation conference and exhibit, Convention Hall, Philadelphia. Society's address: 313 Sixth St., Pittsburgh 22, Pa. Executive director: William H. Kushnick.

Sept. 15-17, American Rocket Society: Fall meeting, Hotel Statler-Hilton, Detroit. Society's address: 500 Fifth Ave., New York 36, N. Y. Secretary: A. C. Slade.

Sept. 16-18, Electronic Industries Association: Fall meeting, St. Francis Hotel, San Francisco. Association's address: 1721 DeSales St. N.W., Washington 6, D. C. Secretary: James D. Secrest.

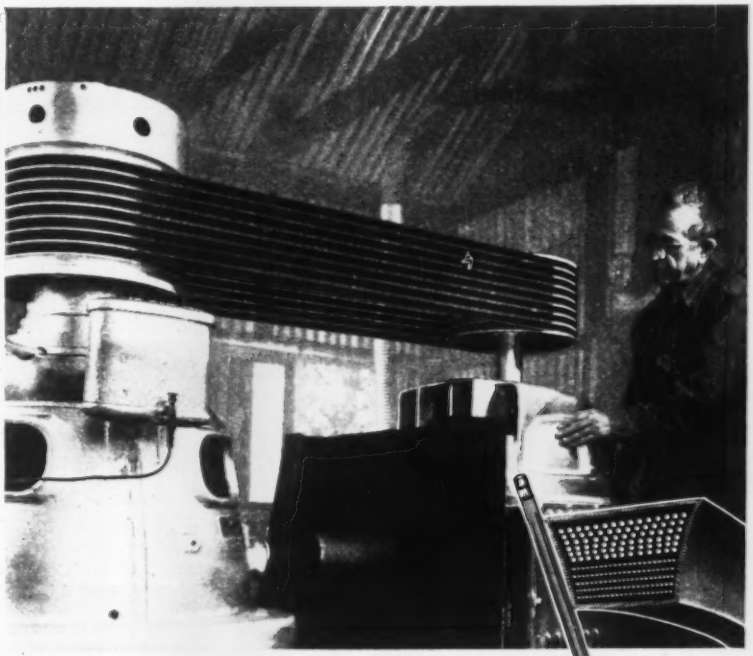
Sept. 17-18, American Supply & Machinery Manufacturers' Association Inc.: Industrial distribution forum, Hotel Statler-Hilton, Cleveland. Association's address: 2130 Keith Bldg., Cleveland 15, Ohio. Manager: W. B. Thomas.

Sept. 17-19, National Industrial Conference Board Inc.: General marketing conference, Waldorf-Astoria Hotel, New York. Board's address: 460 Park Ave., New York 22, N. Y. Secretary: Herbert S. Briggs.

Sept. 19, Malleable Founders Society: Fall semiannual meeting, Hotel Cleveland, Cleveland. Society's address: 1800 Union Commerce Bldg., Cleveland 14, Ohio. Executive vice president: Lowell D. Ryan.

Sept. 22-24, American Management Association: Personnel conference, Statler-Hilton Hotel, New York. Association's address: 1515 Broadway, New York 36, N. Y. President: Lawrence A. Appley.

No. 1 choice of industry...



the V-belt with concave sides

It is easy to see why concave sides insure far longer belt life... and make Gates the industry's first choice in V-belts.

Just make this simple test: Bend a Gates V-Belt with concave sides (Fig. 1) as if it were going around a sheave. Feel how the sides **fill out**... become perfectly straight (Fig. 1-A).

Note how this belt makes full contact with the sides of a sheave ... grips the sheave evenly, distributing wear uniformly across the sides of the belt. Uniform wear lengthens belt life — keeps costs down.

With a straight-sided belt the sides bulge out on the bend and wear is concentrated on the bulge. Uneven wear shortens belt life — increases belt costs.

Because Gates V-Belts with concave sides are so universally preferred, they are also the **most widely available.** There are Gates distributor stocks in industrial centers throughout the world.

The Gates Rubber Company, Denver, Colorado

Gates *World's Largest Maker of V-Belts* TPA 313

Gates VULCO ROPE Drives

NEW

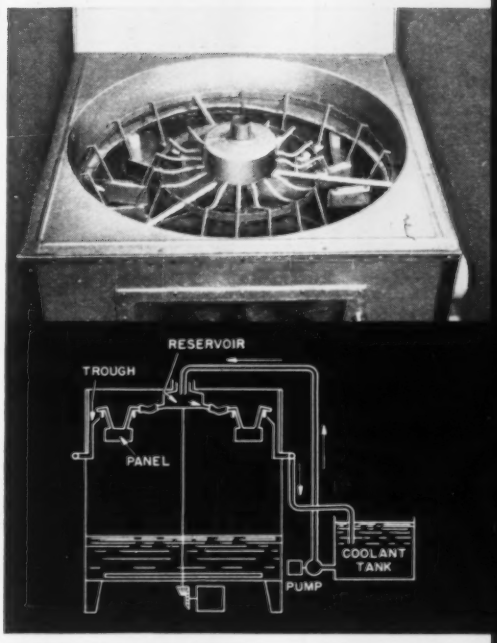
from Standard Oil THE MAGIC BOX

Corrosion steals $5.5 billion from industry annually. Standard Oil is in the forefront of the fight to control this loss. Standard's research scientists have developed a new method for measuring the effectiveness of rust preventives. This new test takes less than one-twentieth of the time of previous tests—and is about three times as precise.

Using a controlled humidity cabinet for testing corrosion, these Standard research men installed a system for cooling metal test panels (previously treated with rust preventive) so that their surface temperatures are lower than the temperature in the cabinet. Temperatures of panel surfaces and of cabinet atmosphere are held accurately. Controlling the temperature of the panels controls the rate at which water condenses on them. This in turn (for the first time) permits accurate control of the amount of condensation on the panels. Rust preventives are more speedily and precisely tested. Science, as a result of this work, has a new tool with which to test corrosion.

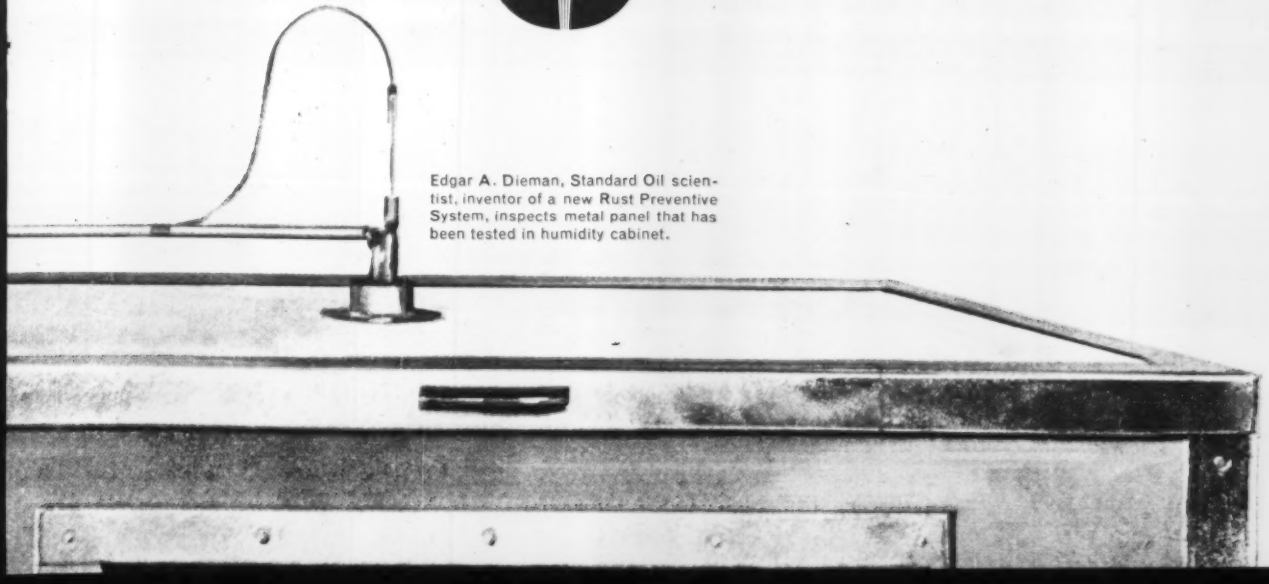
This is the research pay-out industry receives from Standard Oil. This is the something extra that backs up the Standard Oil industrial lubrication specialist who calls on you. This is the something extra found in the products he has to sell.

To know more about how Standard Oil industrial lubrication specialists—and Standard's research program—can help you, call the Standard Oil office nearest you in any of the 15 Midwest and Rocky Mountain states. Or write **Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.**



Top view and cross section of Accelerated Corrosion Test cabinet.

You expect more from STANDARD and get it!



Edgar A. Dieman, Standard Oil scientist, inventor of a new Rust Preventive System, inspects metal panel that has been tested in humidity cabinet.

New **Longer-Wearing** Pattern in Wire Rope Styles!

After three years of extensive field trials this, the newest of Roebling's wire ropes, is now ready to go to work for you on a service basis that will exceed that of *the wire rope you are now using.*

Roebling Herringbone* combines the best features of both regular and Lang lay rope constructions: being made up of two *pairs* of Lang lay strands and two strands of regular lay. The regular lay strands separate the two pairs of Lang lay strands. Thus, in one rope you have the superior flexibility and abrasion resistance of Lang lay and the greater structural stability of regular lay.

For the past three years, under all kinds of conditions, Herringbone has been used for general hoisting, holding and closing lines, shovel ropes, wagon scraper ropes and dragline ropes. The results have been wonderful . . . excellent flexibility, exceptional resistance to shock and abrasion, smooth, easy operation around drums and over sheaves, smooth spooling properties and structural stability unequalled by other rope for the same job.

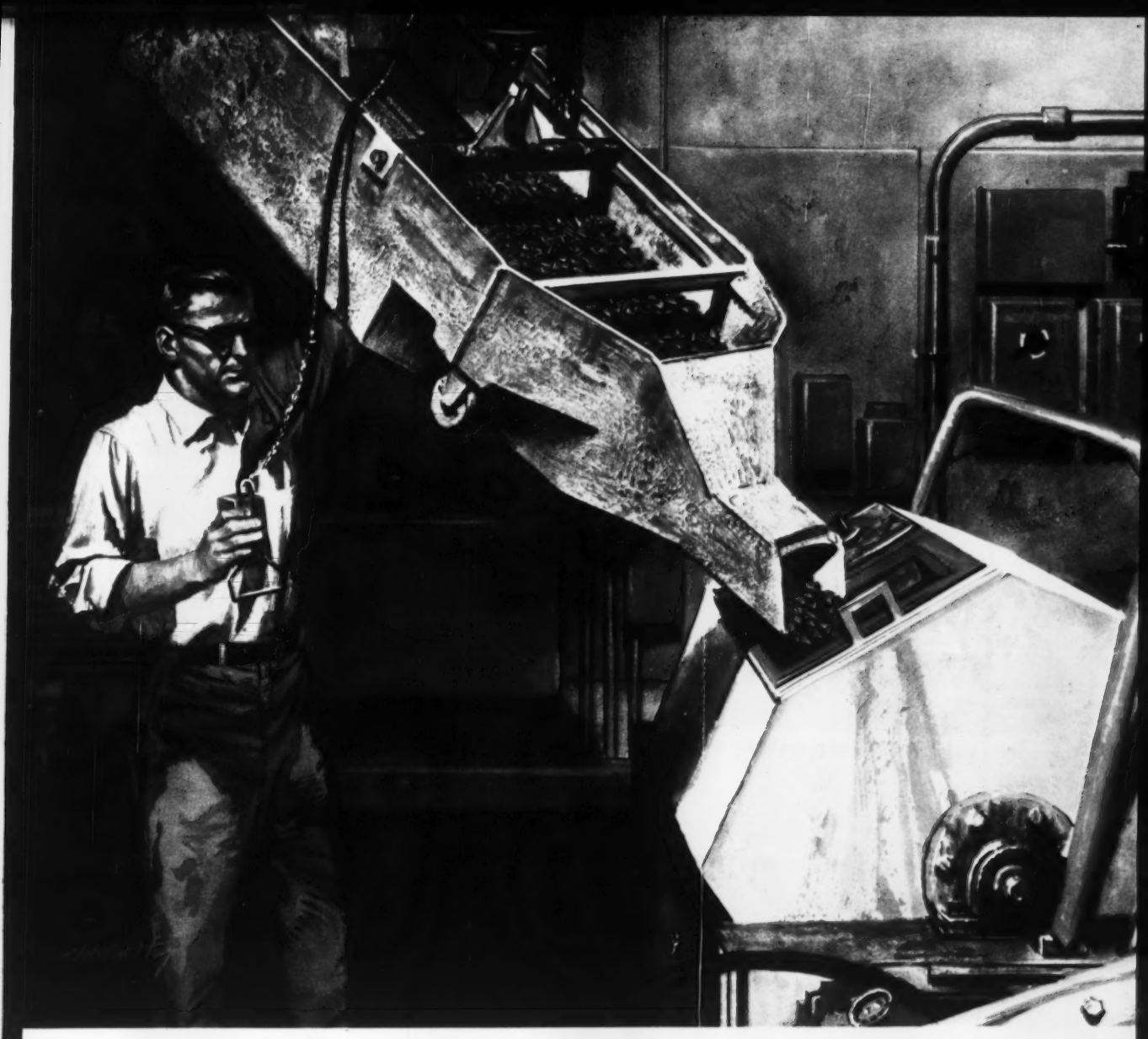
There has never been a better time—or a wider need—for a wire rope that returns so much service for its cost. And, in addition to being a top performer on the job, Herringbone eliminates the necessity of stocking Lang lay for one purpose and regular lay for another.

You are invited to get in touch with your Roebling distributor or write Wire Rope Division, John A. Roebling's Sons Corporation, Trenton 2, New Jersey, for further and fuller details on the *investment* qualities of this new and highly serviceable rope.

*Reg. appl. for

ROEBLING

Branch Offices in Principal Cities • Subsidiary of The Colorado Fuel and Iron Corporation



The "Touch of Gold" is going into this barrel

. . . because the operator is adding Norton TUMBLEX abrasive, widely recognized as an unequalled contribution to better, lower cost finishing. For example, after shifting from hand finishing to barrel finishing with ALUNDUM TUMBLEX "T" abrasive, a leading aircraft parts manufacturer reports yearly savings of over $90,000. Norton brings this value-adding, profit-increasing "Touch of Gold" to industry in the widest range of grinding, cutting, polishing and tumbling operations . . . by the most complete line of abrasives . . . backed by world-wide resources and services.

NORTON COMPANY, General Offices, Worcester 6, Massachusetts.

NORTON
ABRASIVES

Making better products...to make your products better

creative designing calls for an open mind

Leonardo da Vinci's design for a self-driven car

Scale model courtesy of IBM

EVEN DA VINCI'S SELF-DRIVEN CAR COULD HAVE BEEN BETTER WITH HELP FROM AN SKF ENGINEER.

When you receive the recommendations of an SKF engineer, you know they are in no way determined by possible restrictions in his product line. That's because the SKF line includes all four types of ball and roller bearings, in many thousands of sizes. This gives every SKF engineer the kind of flexibility he needs to keep an entirely open mind on any bearing problem. Give us your problem and see. 7858

Spherical, Cylindrical, Ball, and "Tyson" Tapered Roller Bearings

EVERY TYPE—EVERY USE

SKF®

SKF INDUSTRIES, INC., PHILADELPHIA 32, PA.

*REG. U.S. PAT. OFF.

Claymont's new Fabrications Shop is completely equipped to produce large industrial and structural weldments, as well as job-shop steel plate fabrications of all kinds. Integrated facilities make Claymont a reliable source of quality steel plate and plate products for industry.

by d'Arazien

CLAYMONT
FABRICATED STEEL PRODUCTS

CHECK CLAYMONT FOR—Alloy Steel Plates • Carbon Steel Plates • Stainless-Clad Steel Plates High Strength Low Alloy Steel Plates • CF&I Lectro-Clad Nickel Plated Steel Plates • Pressed and Spun Steel Heads • Manhole Fittings and Covers • Fabricated Steel Products Large Diameter Welded Steel Pipe

PRODUCTS OF WICKWIRE SPENCER STEEL DIVISION • THE COLORADO FUEL AND IRON CORPORATION

Plant at Claymont, Delaware • Sales Offices in all Key Cities

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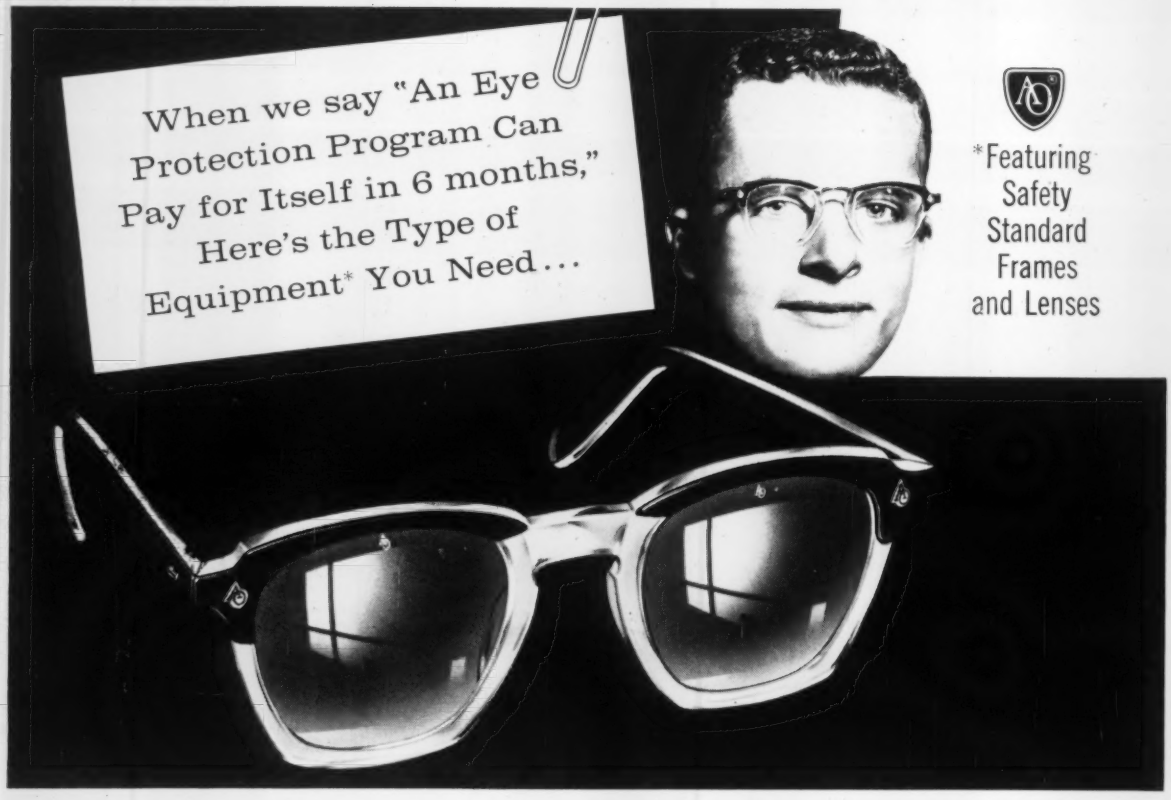
When we say "An Eye Protection Program Can Pay for Itself in 6 months," Here's the Type of Equipment* You Need...
*Featuring Safety Standard Frames and Lenses

AO F9700
2-TONE-ULTRASCOPIC SAFETY GLASSES WITH CALOBAR LENSES

Handsome? Surely, but most important, real *quality* protection. This particular model protects against glare, heat, ultraviolet and infrared radiations as well as against impact of flying particles. Recommended for heat treating, R.R. transportation men, bus and truck drivers and other outside workers. Also available with clear safety lenses.

Our records are full of case histories showing how companies cut costs through eye protection. Want the details? Write us direct at Southbridge, Mass., or call your nearest American Optical Safety Representative.

AO 315 FOUNDRY GOGGLE

New 57.8 mm. wide vision lenses . . . double ventilation (40 mesh screen) . . . and a perfect fit over most types of spectacle glasses. *Soft* plastic mask — with leather available. Super Armorplate clear or Calobar lenses, medium, dark or extra dark. For chipping, melting, pouring, grinding etc. Also available as a dust goggle with 150 mesh screen arrangement. (Cat. #316).

NEW AO SCS-202 LIFT-FRONT ULTRASCOPIC

For open hearth furnace work and under helmet when welding. Features a half-eye metal lift-front segment, hinged to frame top. Special friction joint permits lift section to be raised and lowered repeatedly without loosening. Section is available with cobalt blue or Calobar lenses and can utilize a near point segment for welders who need corrected vision for overhead or shoulder high work.

1833-1958 • 125 LEADERSHIP YEARS

Always insist on AO Trademarked lenses and frames

American Optical
COMPANY
SAFETY PRODUCTS DIVISION

SOUTHBRIDGE, MASSACHUSETTS • *Safety Service Centers in Principal Cities*

Charging some of the first T-ingots to arrive in the U.S. Photographed at an independent aluminum fabricator—the Kawneer Company, St. Charles, Illinois

To aluminum fabricators...

who value the importance of ingot design

As specialists in the production of high-quality aluminum ingot in almost every shape and form, Aluminium Limited research is constantly seeking ways to improve its ingot products to serve its customers better. Whether your ingot problem is a question of shape . . . dimensional tolerances . . . or alloy composition control, Aluminium Limited's engineers have the know-how to help meet your ingot fabricating or aluminum remelt requirements.

The T-ingot design is one of several recent developments that have brought savings to many customers in the U.S. Available in 750- and 1500-pound sizes, and shaped like a flattened T, these ingots have been specially tailored to speed handling by fork-lift trucks . . . have successfully reduced railcar unloading time up to 50%. Precision formed, T-ingots stack compactly, up to 10 high, with greatly improved stability. For information about the T-ingot or aluminum in any other ingot form, call or write the nearest office of Aluminium Limited Sales, Inc.

Aluminium Limited

*Ingot Specialist...*serving
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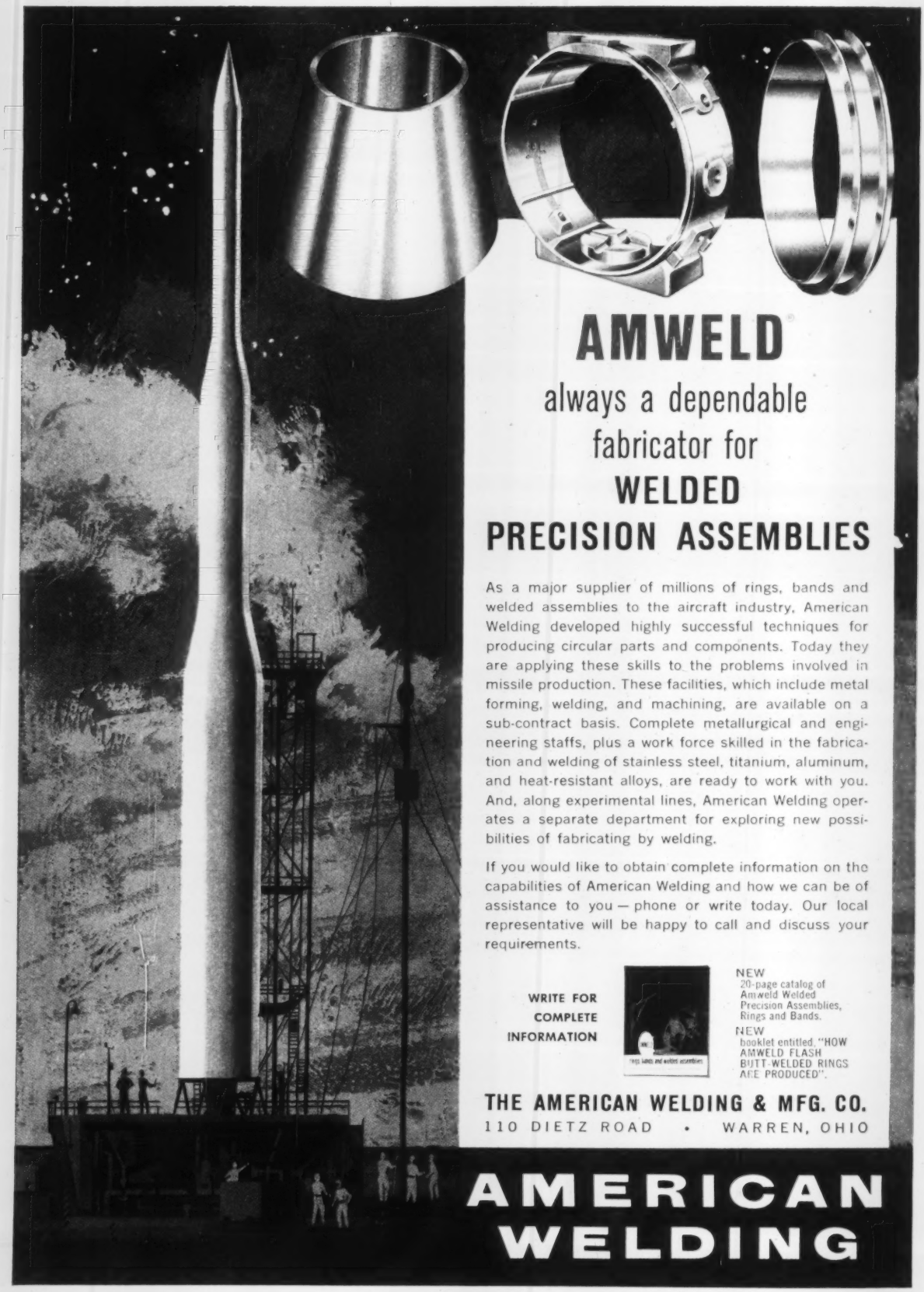

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STEEL
August 25, 1958

Metalworking Outlook

Steel Prospects for 1959

Look for steel ingot production of about 110 million tons in 1959, far above the 82 million expected this year and only slightly under the 112.7 million turned out in 1957. The highest annual output thus far was in 1955—117 million tons. Rock-bottom steel inventories, an anticipated upturn in consumer spending, rising federal spending, and world unrest will add up to the sharply improved performance next year.

New Canmaking Process

Continental Can Co. has developed a method that turns out more than 750 metal cans a minute, 50 per cent faster than previous production lines. The company has had it in commercial operation for a year. Announcement was delayed to satisfy Continental that the process is commercially feasible and will enable economies in can manufacturing. Containers consumed 11.7 per cent of the steel produced in the first half.

Big Scrap Deal in Liberty Ships

The 47 Liberty ships the U. S. is to scrap will provide about 3300 tons of prime grade steel scrap each, plus large quantities of brass, copper, and other nonferrous metals. The steel is returning to the mills after a cycle of about 15 years—the average time a household stove takes to make the round trip from the steel mill, to the stovemaker, to the buyer, to the scrap processor, and back to the mill. Refrigerators come back in about 12 years, washing machines and ironers in five years. When sold, the 47 ships will probably wind up in yards on the east, west, and gulf coasts. The Maritime Administration will open bids Sept. 10.

Road Spending Climbs

Watch for capital spending for highways to hit a record $6.2 billion in 1958 and swell to $8.1 billion by 1962. Road outlays were $5.7 billion in 1957. Even so, the highway program still lags earlier expectations. Originally planned as a 13-year program, it will now take at least 20 years to complete (some experts say 30).

Detroit Plugs Fuel Economy

Fuel economy will get the big advertising play for '59 auto models. Compression ratios will edge up gradually, but no breakout from the present top of 10.5:1 is expected. The economy will result from leaner carburetion and hotter engines. Until the Big Three can get their small cars into production (probably no earlier than about a year from now), they'll be plugging economy features on their conventional models.

Aerojet-General Developing Cargo Sub

Here's what tomorrow's ocean-going freighters may look like: When underway, the hull would not be visible (submerged perhaps four diameters),

Technical Outlook—Page 79 Market Outlook—Page 115

but a knifelike fin would project above the surface to support a gondola for living quarters, navigating bridge, and running lights. When not in motion, the hull would rise to the surface. Propulsion would be water jets, powered by a nuclear source. Aerojet-General Corp.'s Underwater Engine Div. will complete a feasibility study of the ship next month.

British Auto Industry Prosperous

Among British industries, automakers continue to be the most prosperous. First half exports climbed to a new peak of 250,000 vehicles, beating the previous record (1955) by 40,000. By the end of June, production exceeded 716,500 units (a record average of more than 27,500 per week). Full output is expected for the rest of the year, although some slowdown in the production of commercial vehicles is reported.

India Raises Steel Sights

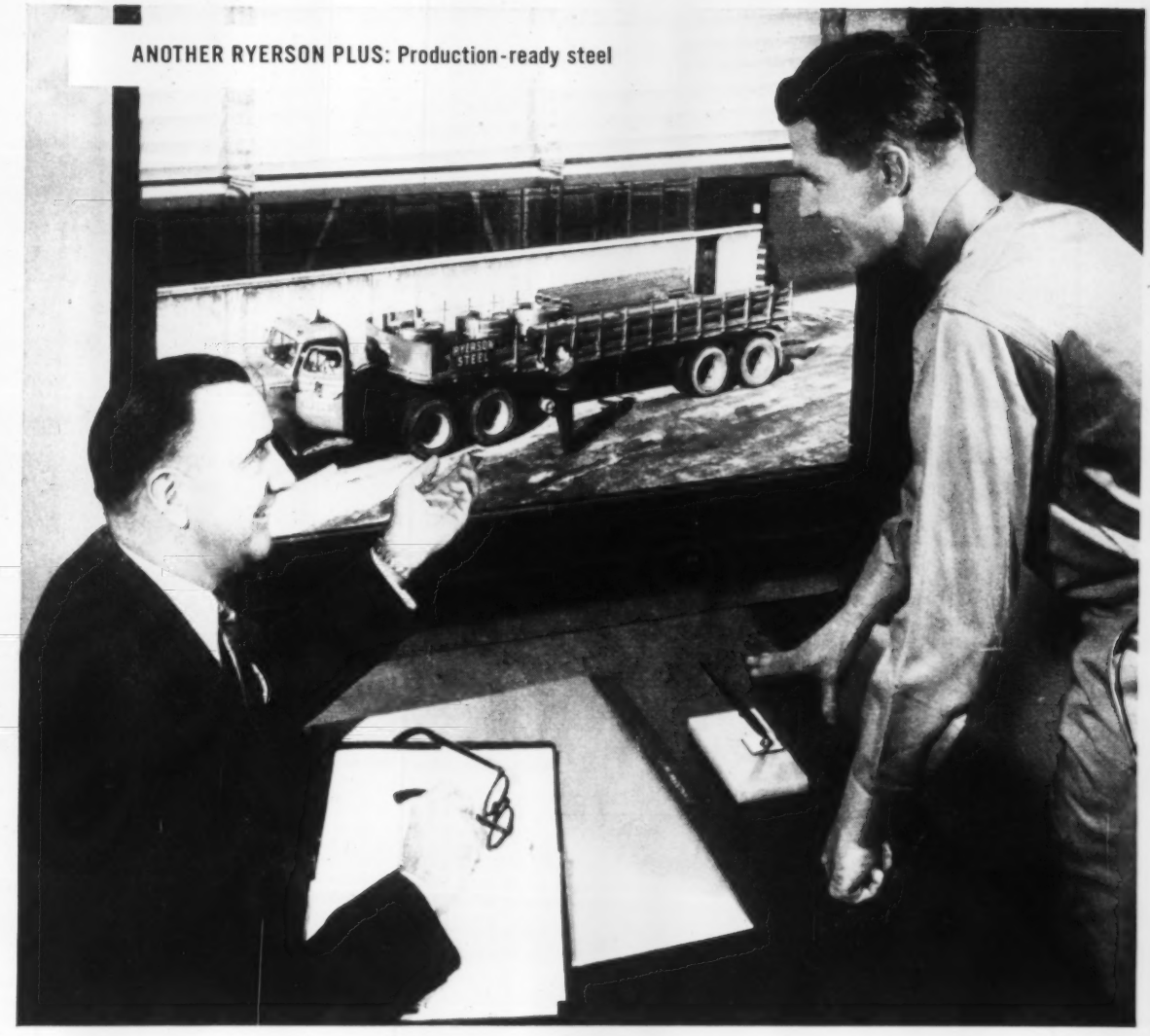
India expects its ingot steel production to hit 6 million tons a year by 1961, says the National Metallurgical Laboratory, Jamshedpur. Tata Iron & Steel Co. is completing an expansion program raising its annual production to 2 million tons of ingot steel. In addition, a low-shaft pilot plant will soon be operating at the NML. Using the Demag-Humboldt process, it will have a capacity of 15 tons of iron per day. India's iron ore quality and reserves are excellent, but its sources for coking coal are unsatisfactory. Attempts are being made to develop methods of using noncoking coals for iron production.

More Japanese Steel by 1962

Sumitomo Metal Industries Ltd. will spend $83 million to increase its capacity to about 825,000 tons of pig iron, 1.5 million tons of steel ingots, and 1.3 million tons of finished steel products. The program is scheduled for completion early in 1962. Some $33 million of the money will be borrowed from the Japan Development Bank, which, in turn, borrowed it from the World Bank.

Straws in the Wind

Although British shipbuilders still have enough orders to provide full employment for the next two years, heavy cancellations and lack of new business are causing concern . . . Ford Motor Co. has proposed to the Argentine government that it build a plant in that country to make trucks and tractors . . . International Harvester Co. spent $22 million for capital investment and at least that much for engineering to put its new line of tractors and implements into production . . . Small business gets only 6 per cent of major procurement dollars by direct award, says the Pentagon . . . The new Air Force Academy at Colorado Springs, Colo., scheduled to open this fall, will use more than 5 million lb of aluminum . . . Workers brought a record number of complaints against both their unions and employers in the year ended June 30—5406, vs. 2299 in fiscal 1957.



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New Illinois Tollway uses DSC Electro-Welded Wire Fabric to make concrete pavement crack-resistant, traffic-safe, durable

Through the courtesy of the Illinois State Toll Highway Commission, we are privileged to reproduce this "men at work" photograph. It is a view taken along the southbound strip of the North Illinois Tollway east of Rockford. Among the participating contractors who used DSC Portsmouth Welded Wire Fabric on this project were CK&G Associates, Skokie, Illinois; McCarthy-Mass-Dillon, Huntley, Illinois; John C. Peterson Construction Corporation, Baldwin, N. Y.

WHAT YOU SEE is called a "paving train." The huge bucket, which rides on a long reaching boom, is pouring the top layer of concrete over the reinforcing steel mesh already in place. The spreader or grader at the left is leveling this layer to a uniform depth of 4".

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What Reuther Wants

For the last two and a half months, Walter P. Reuther has been playing cat and mouse with the auto industry.

The UAW has no contract, but the time hasn't been right for Mr. Reuther to pounce. Too many men have been without jobs.

Now that 1959 models are beginning to roll, his strategic bargaining position will change in direct proportion to how many potential customers are attracted to showrooms.

But don't forget: No matter how much his bargaining position improves or deteriorates, he must still put on a good show for his membership. The wage package he obtained in 1955 didn't turn out as well as the one Dave McDonald got for the steelworkers in 1956.

To retain his top-level spot in the AFL-CIO hierarchy, Mr. Reuther in the long run must equal or surpass the accomplishments of his contemporaries.

Here is his plan: He says we are in trouble in 1958 for the same basic reason we were in 1929: Productive capacity has expanded at a much faster rate than purchasing power.

To cure the "imbalance," he says, workers must get their share of increased productivity.

He figures 500,000 General Motors workers alone were shortchanged 30.8 cents for each hour worked in the last ten years.

So don't be fooled by Mr. Reuther's present demands, which include an increase in base pay, pension adjustments tied to the consumer price index, extended vacations, severance pay, and moving expenses when a plant relocates.

The "small" package that Mr. Reuther says can be paid for out of increased productivity is only the beginning.

He ultimately wants his grandiose plan: Splitting half a company's operating profits between auto buyers (as rebates) and workers (as bonuses).

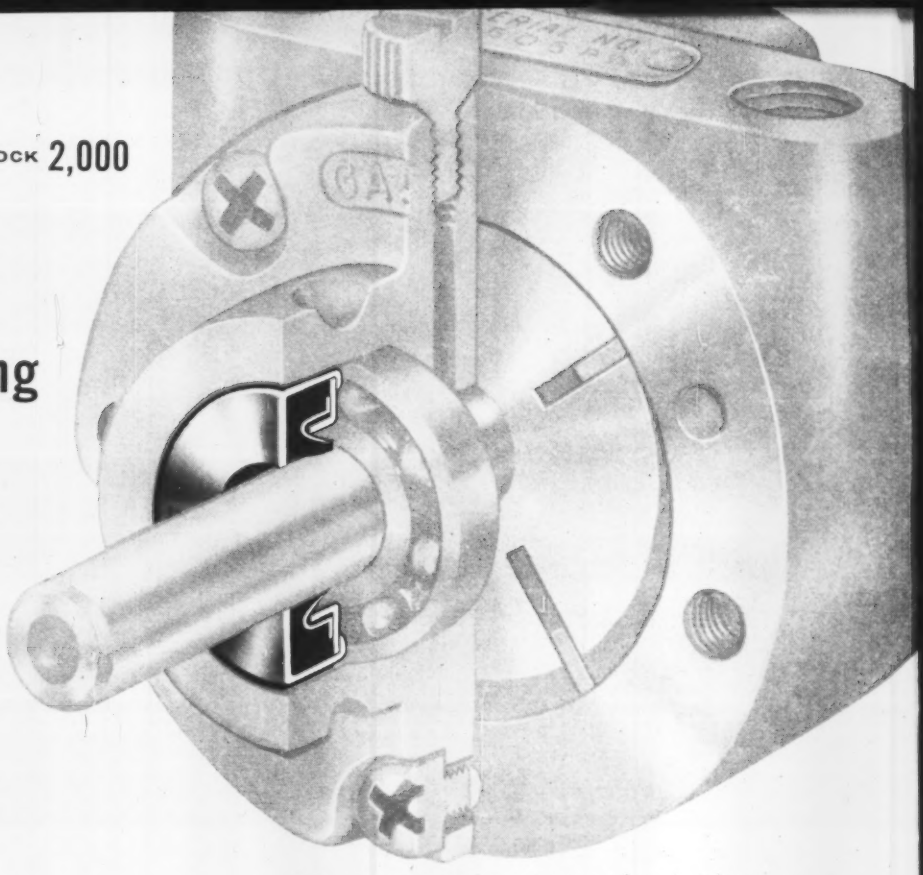
That socialistic program for usurping the prerogatives of owners and managers may sound like a screwball scheme, but don't think it couldn't happen as long as labor unions remain largely an unregulated monopoly.

It is a reminder that management needs to do these things: 1. Stand pat on demands that don't make sense. 2. Tell its story to its employees and the public honestly and straightforwardly. 3. Fight for legislation in the next Congress that will place labor and industry on an equal footing.

Irwin H. Such
EDITOR-IN-CHIEF

MORE ABOUT THE GARLOCK **2,000**

Standardizing on Garlock KLOZURE* Oil Seals Pays Off for Gast



Model 51 Garlock KLOZURE protects bearing on Gast Air Motor made by Gast Manufacturing Corp., Benton Harbor, Mich.

Air motors require a long-life seal which will prevent leakage without creating excessive friction. That's one reason why Gast Mfg. Corp. use Garlock KLOZURE Oil Seals on both their Air Motors and Air Pumps. These products operate under pressures to 90 and 30 psi respectively, and at shaft speeds from 1000 to 5000 rpm.

Gast engineers report excellent results with Garlock Seals.—"They outlast some other parts of our products and are easily and economically replaced during major overhauls." Gast has standardized on Garlock KLOZURES for over 25 years—They like the compact design of KLOZURES, the wide availability of replacements, and the broad choice of sizes.

You can give *your* products the "seal of quality" too—specify Garlock KLOZURE Oil Seals . . . they are part of the famous Garlock 2,000 . . . two thousand different styles of packings, gaskets, and seals to meet all your needs. Consult your local Garlock Representative or write for KLOZURE Catalog 20. Other Garlock products are described in Sweet's Product Design File.

Other General Purpose KLOZURES

Model 53— for normal to high speeds

Model 71B— for large shafts in normal to high speed service

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Model 65— for normal to high speeds

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If auto strike comes, Henry Ford II (left) and Walter Reuther may meet head on; meanwhile...

Walkout Threat Brakes Recovery

JUST THE THREAT of an auto strike is putting the brakes on our mild business recovery. A walkout would bring it to a jarring halt.

Here's what the suspense is doing:

• Sheet steel product manager—"The auto companies aren't starting to buy with their customary rush because they know that would give labor an edge."

• Arthur Koch, Columbia Metal Stamping Co., Cleveland—"Our customers must be holding off until they see what will happen in autos."

• Pittsburgh forging company—"Automakers are not projecting their planned buying as far ahead as they have in previous years."

• Western Pennsylvania tube producer—"Sales to Detroit show only small signs of increasing . . . at a time when they should be booming. We believe the fear of a strike is one reason."

• A Cleveland maker of fasteners—"Automakers will order slowly, but steadily, for the next month. They don't want an oversupply if a strike occurs."

No Effect Yet—Not all companies or industries are feeling the effects of the impending strike. But many, such as makers of industrial rubber products, believe they will be hit in the next couple of weeks.

All auto suppliers agree, of course, that a strike would be disastrous. A typical comment is that of Clarence Custer, president of American Stamping Co., Cleveland: "If the strike comes, we are afraid that our business will drop off about 60 per cent immediately."

Odds for Strike Rise—An auto strike is more likely now than at any time since May 29 when General Motors Corp. canceled its contract. Neither the companies nor the union nor workers want one, despite the topheavy membership vote authorizing union officials to call a walkout at GM, Ford Motor Co., and Chrysler Corp. if it is necessary. Those votes are routine, won from the members by labor officials' pleas that they're needed to give them "freedom to negotiate."

Although auto workers would be reluctant to hit the bricks, there's no doubt they would do so if President Walter Reuther asked them to. But Reuther the politician knows the reluctance; hence his extreme caution. He has set no deadline for a strike, a customary gambit in negotiating. He has

given no hints about who the target would be, another of his favorite ways to build the tension. He has used all his power and prestige to stop wildcat strikes, particularly at Chrysler. Normally, wildcats are condoned by labor leaders to soften up management for the final settlement.

Paradox—Then why is a strike more likely? Because chances for one always rise when negotiations and strains drag on as they have. Each side has gradually assumed positions difficult to retreat from. The Big Three have signed with many of the minor unions on contract extension terms also offered the UAW (see the box). They would be slow to repudiate those pacts by agreeing to something better, or even much different, for the UAW.

The Target—Ford is the most likely target for a strike. Action against Chrysler wouldn't necessarily influence the other two. A move against GM would cost the union more than twice as much as at Ford. The UAW figures it would cost $41 million to strike GM for seven weeks, $16.5 million at Ford and $11.3 million at Chrysler.

That totals $68.8 million—and it may be the union's seven-week strike bill. The Big Three's united front still stands. The UAW may have to strike all three, although it will still try its previously successful divide-and-conquer tactics. Look for GM and Ford to stand firm, and probably Chrysler, too. If a strike comes, the probable strategy will be to hit Ford. The companies would then move and all go out. How that would be managed is uncertain. The other two could legally lock out, although that's unlikely. They could close down because of part shortages. They could extend their model changeover period. Or the union could surprise them and strike all three.

Bitter experience has proved to motordom the illusion of any "gain" the unstruck company may have. Chevrolet could pull far ahead of Ford in the production race if only Ford is struck, but GM would pay for the privilege in a less favorable wage pact. As a "reward" for taking a strike or signing first, the union has been giving a slightly better deal to the first signer.

What the UAW Wants

THE UAW's frequent shifts in tactics (from demands for a short week, to profit sharing, to the present contractless situation) obscure the nature of the demands still before the auto companies. They vary slightly from company to company, but are basically these 11:

1. **More SUB.**
2. **More pensions** (including cost-of-living adjustments).
3. **Transfer rights when plants are closed down.**
4. **Clearer definition of seniority rights.**
5. **Across-the-board wage hike.**
6. **Higher job class differentials** (to benefit the skilled).
7. **Another holiday.**
8. **Longer vacations.**
9. **Added insurance.**
10. **Severance pay.**
11. **Higher annual productivity increases.**

Emphasis is on the first three. Total cost of the 11 would be 48 cents an hour. For example, the pension demand would cost 13 cents an hour; the job class differential 12 cents; the insurance 2 cents.

Timing—If the strike comes, it will be in late September or early October, just as '59 model production is speeding up. GM is already starting its buildups and will be in high by mid-September. Chrysler starts next week on the '59s and will be producing in good volume by the third week of next month. Ford will introduce last, starting buildups in mid-September and reaching normal rates by mid-October.

By the time Ford comes along, the UAW will have had an inkling of how the new models will go. The better the outlook, the tougher the union will be and the less the risk of asking autoworkers to go home once more after a year of on-again, off-again employment for thousands of them.

The Auto Influence — Although no contract has been signed, the negotiations have nevertheless strongly influenced other settlements made this year. The Big Three offer has served as a rule of thumb for what other managements will give—between 7 and 8 cents in wages for a one-year contract or 14 to 16 cents for a two-year pact. Associated Industries of Cleveland shows how the wage

What the Automakers Want

IN CONTRAST with the union, the auto companies have been consistent with this offer:

- **Extend the old contract** for two years to June 1, 1960, which means:
- **The annual improvement factor** would guarantee auto workers at least 12 cents per hour more in the next two years.
- **The cost-of-living clause** would virtually cinch more pay for workers. Escalation gave them 16 cents more during the three-year life of the contract that expired at the end of last May.

Under those provisions, the conservative view is that an autoworker could expect about 16 cents more by June 1, 1960. That would boost his average rate to at least $2.67 an hour, vs. $2.51 now.

And fringe benefits would be continued. (They cost GM 56 cents for every hour worked.)

On money matters, Chrysler stands with GM and Ford, but it also wants tighter work standards which approximate those of the Big Two.

The terms have already been accepted by many of the unions with which the three firms deal.

settlements (excluding fringes) up to Aug. 15 this year compare with prior years in northern Ohio, a representative area because of its great industrial diversity:

1958	7.28	cents
1957	7.34	
1956	7.62	
1955	8.51	
1954	4.96	
1953	6.97	
1952	5.14	
1951	7.48	

The auto negotiations have also influenced shorter contracts. Many UAW locals are merely extending for three to nine months. Settlements with other unions are most frequently for one year.

Accent on Fringes—Most of the time of negotiators is being devoted to rewriting seniority, grievance, and vacation clauses, says Ray Vacha, AIC's industrial relations director. The recession has shown their ambiguities and other inadequacies. For example, is a man laid off for two months still eligible for a full vacation?

In the absence of the auto settlement, pattern bargaining is out thus far, although one consistent demand has been for a cost-of-living clause.

Recession Bargaining—The style of negotiations this year is recession bargaining. The unions are more amenable than they have been at any time in the past decade. "Management is getting in some licks at last," says one negotiator. That's true in Detroit, too. Strike or no strike, the ultimate auto settlement is likely to be this: The present company terms with some facesavers, such as a retroactive date to June 1 or sweeter pension and SUB deals.

AIC Publishes Handbook

In keeping with the increasing need for statistical information, Associated Industries of Cleveland has released a labor relations handbook for management.

The Cleveland group believes that effective personnel management requires development of reasonable policies consistent with community practice. The book is a comprehensive guide to personnel practices in the Cleveland area.

The survey is supplied to AIC members. It is not for sale in northeastern Ohio. Nonmember companies outside that area may purchase it for $15. Supplementary material is $10 annually. Write: Associated Industries of Cleveland, 1740 E. 12th St., Cleveland 14, Ohio.

Builds Mill in Alaska

Seidelhuber Iron & Bronze Works Inc., Seattle, is building a merchant bar steel rolling mill in Fairbanks, Alaska. It will have an electric furnace. Company intentions are to produce 1000 tons of steel monthly. Ingots will be rolled into such items as reinforcing bars.

Bethlehem's Earnings Down

Bethlehem Steel Corp. reports first half net income of $53,822,909 (vs. $103,701,162 in '57's first half) on net billings of $1,003,608,711 (vs. $1,363,334,801).

New prices, says President A. B. Homer, are not adequate to meet higher employment costs; he says they should have been $1 a ton more—just to meet direct labor costs.

TRITON
Vital Statistics

LENGTH—447 ft

DISPLACEMENT—5900 tons

TYPE—Radar picket ship

SAIL (conning tower)—71 ft

NUMBER OF DECKS—Three

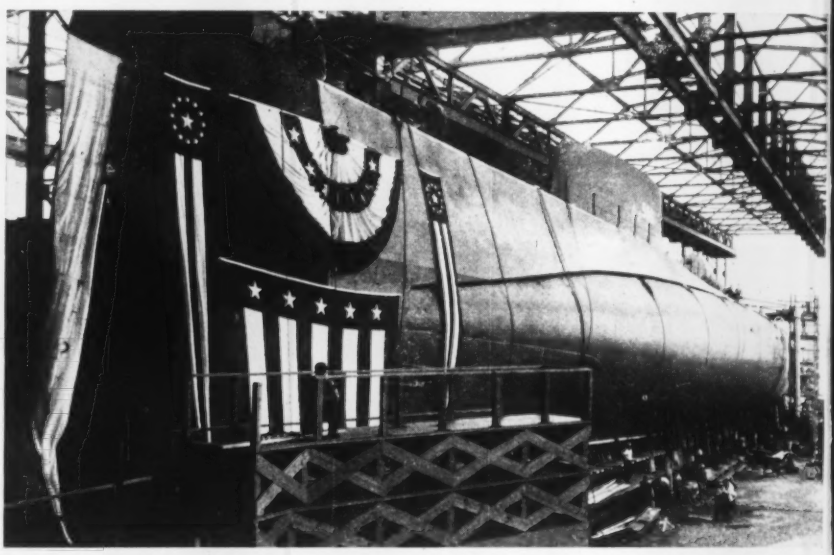
PROPULSION—Two water cooled reactors

RANGE—Over 100,000 miles without refueling

SPEED (Estimated)—Surfaced, 25-30 knots; submerged, 15-18 knots

CREW—145

COST—Around $100 million



The Triton offers proof that atomic subs mean . . .

Mounting Market for Metalworking

BESIDES being the largest submarine ever built, three "firsts" went into construction of the *U. S. S. Triton* (SSR586) launched last Tuesday (Aug. 19) into the smooth waters of the Thames River at Groton, Conn.:

1. **She's the first atomic sub designed as a radar picket ship.** Her mission: To range far off the U. S. mainland and provide early warning of enemy attack by missiles, submarines, surface ships, or aircraft. To perform this function, she will carry tons of complicated radar, sonar, and communications equipment. That's why the *Triton* is so much larger than other nuclear subs (see lineup).

2. **She's the first to be powered by two pressurized water reactors.** This will probably make her the fastest sub in the world (unofficial estimates peg surface speed at 25 to 30 knots or slightly better, submerged speed at around 15 to 18 knots). Two reactors also provide increased operational reliability, necessary because of the complex and heavy gear she carries and her importance as an "early warning station." Her range is pegged at over 100,000 miles without refueling.

3. **She's the first sub to be equipped with an automatic dial telephone switchboard** (capacity 40 lines) for fast intership communications. Power comes from the reactors. Until now subs have used sound-powered phones.

Size — With a displacement of 5900 tons and a length equal to the height of a 35-story building (447 ft), the *Triton* can carry 145 men, has three decks (the conventional sub has only one). Her sail (conning tower) alone measures 71 ft, which is one-third longer than the Navy's first atomic sub.

Octopus — Launching of the *Triton* gave U. S. defense planners their eighth nuclear striking arm. The seven others: *Nautilus*, *Seawolf*, *Skate*, *Skipjack*, *Swordfish*, *Sargo*, and *Seadragon*. Only the *Nautilus*, *Seawolf*, and *Skate* are in commission. Electric Boat Div. of General Dynamics Corp. has built five of the eight.

Materials — Steel is the major structural metal in the *Triton*. While the type steel and where it's used is in most cases classified information, General Dynamics says the *Triton* contains 3200 tons of carbon, stainless, and other alloy steels (24 different types in all).

Carbon steel was used in the form of plates, sheets, structurals, and bar stock; stainless in plates, sheets, bar stock, and pipe (most of the 83,000 ft of piping in the *Triton* is stainless although copper is found in some areas). Other alloy steels were purchased mainly as plates and bar stock.

Copper is chiefly used for the 553,195 ft of electrical cable. Brass, bronze, and other copper alloys are employed in scattered applications.

Uncle Sam's Nuclear Sub Lineup*

Name & Type	Length	Displacement	Commission Date & Builder
NAUTILUS—Attack	320 ft	3200 tons	1954—General Dynamics Corp.
SEAWOLF—Attack	338 ft	3400 tons	1957—General Dynamics Corp.
SKATE—Attack	268 ft	2360 tons	1957—General Dynamics Corp.
SWORDFISH—Attack	268 ft	2360 tons	1958—Portsmouth, N. H. (Navy)
SARGO—Attack	268 ft	2360 tons	1958—Mare Island, Calif. (Navy)
SEADRAGON—Attack	268 ft	2360 tons	1959—Portsmouth, N. H. (Navy
SKIPJACK—Attack	252 ft	2830 tons	1958—General Dynamics Corp.
TRITON—Radar Picket	447 ft	5900 tons	1959—General Dynamics Corp.
HALIBUT—Guided Missile	350 ft	3555 tons	1959—Mare Island, Calif. (Navy)
SCAMP—Attack	252 ft	2830 tons	1960—Mare Island, Calif. (Navy)
SCORPION—Attack	252 ft	2830 tons	1960—General Dynamics Corp.
SCULPIN—Attack	252 ft	2830 tons	1960—Ingalls Shipbuilding Co.
SHARK—Attack	252 ft	2830 tons	1960—Newport News, Va. (Navy)
SNOOK—Attack	252 ft	2830 tons	1960—Ingalls Shipbuilding Co.
THRESHER—Attack	274 ft	3250 tons	1960—Portsmouth, N. H. (Navy)
PERMIT—Guided Missile	373 ft	4240 tons	1960—Mare Island, Calif. (Navy)
POLLACK—Guided Missile	373 ft	4240 tons	1960—Portsmouth, N. H. (Navy)
PLUNGER—Guided Missile	373 ft	4240 tons	1960—Contract Not Awarded
TULLIBEE—Hunter-Killer	260 ft	2175 tons	1960—General Dynamics Corp.
SSN 598—Fleet Ballistic Missile	380 ft	5400 tons	1960—General Dynamics Corp.
SSN 599—Fleet Ballistic Missile	380 ft	5400 tons	1960—General Dynamics Corp.
SSN 600—Fleet Ballistic Missile	380 ft	5400 tons	1960—Mare Island, Calif. (Navy)

*In addition to these, 11 other atomic subs have been authorized.

Aluminum sheets and extrusions plus nickel and nickel-base alloys are also listed by the builder as important construction metals. Other metals are also believed to have been used in the *Triton*, but such information would be restricted.

It's probable the *Triton* uses more metal, foot for foot, than any ship in the Navy. Reason: She has double hulls from bow to stern (the only completely double-hulled ship in the U. S. fleet) and she's said to be as completely compartmentalized as a surface vessel.

Joining—In some respects, *Triton* is a ship built by welding, as evidenced by the fact 500,000 electrodes were used in her construction. One of the big technical breakthroughs since Electric Boat began building nuclear subs was development of welding techniques that make it possible to weld stainless steel piping with a smooth interior and exterior finish at the joint.

It is vital to have smooth surfaces in the piping system; otherwise corrosion becomes a real problem in nuclear propulsion plants. A rough joint, for example, would permit radiation to accumulate and eventually destroy the pressure seal, says Electric Boat.

Inhibitor Saves Cutting Oil

A bacterial inhibitor that will extend the life of soluble cutting oil emulsions two to four times has been announced by Lilly Research Laboratories, Eli Lilly & Co., Indianapolis. Lilly is known most widely as a pharmaceutical house.

Called Elcide 75, the new inhibitor is effective in all standard duty soluble oil emulsions, and also effectively protects synthetic coolants.

In a tryout, Elcide 75 was added to 11 machines at Allison Div., General Motors Corp., Indianapolis. The machines had no prior cleaning. The emulsion was used 22 weeks without separation or odor formation, although the same emulsion, without an inhibitor, had to be replaced within a month.

At another Allison Div. shop, Elcide 75 was added to the existing emulsion in over 1000 machines before inventory shutdown. Normally, all emulsion had to be changed after the closedown. But when the plant was reopened 12 days later, only two machines needed new emulsion because of rancidity.

When in full production, 30 to 45 of these machines had to be recharged with new emulsion each day. Elcide 75 has slowed the change rate to 10 to 12 machines a day, even when the inhibitor was added to old emulsions.

British Scrap Aided

Government will allow free pricing and some exporting. Steel production and exports drop

CONTROL of iron and steel scrap by the British government will be relaxed Nov. 1, allowing some material to be exported. The regulations have been in effect 19 years.

Buyers and sellers will no longer be forced to trade at government-fixed prices. Scrap dealers have been holding excessive stocks for months while they stumped for the lifting of the export ban. Estimates are that about 1.25 million tons of scrap are stockpiled and that permits will be issued for the export of about 250,000 tons.

Steel Production—British steel production in the first half hit about 11.8 million tons, vs. about 12.4 million tons in last year's first half. July output dropped to an annual rate of less than 16.5 million tons, vs. 19 million tons in the same month last year.

Second quarter deliveries of finished steel were 8 per cent under 1957's second quarter levels. Domestic deliveries were down 5 per cent, exports 24 per cent. Shipments to the coal and railroad industries are lower, but the auto and electrical engineering industries are using more steel than they were at this time last year.

First half exports hit 1,373,988 tons, compared with 1,649,196 in the same period last year. The principal recipient was Canada which took 97,000 tons (47,000 tons less than she did in the same period in 1957). New Zealand took over 90,000 tons. Exports to India and Australia fell sharply, but shipments to Argentina went over 77,000 tons, some 36,000 tons over last year's level.

Prices — A reduction in steel prices is a favorite item of speculation, but it seems unlikely in the near future. Production costs are at record heights, as are those of labor, fuel, and transportation.

Productivity: How To Measure It . . .

CARL E. DAVIS

IN MEASURING PRODUCTIVITY, how do you allow for setup times and other "nonproducing" periods in any worker's day?

Carl E. Davis, partner in the Pittsburgh management consulting firm of Paul Edwards & Associates, suggests this approach: Study the machine's operations. Find out how long it takes to produce one piece at the "most comfortable" pace. Assuming that it takes 1 minute, your computation of "standard time per piece" might look something like this:

Produce 1 Piece	1.00 Minute
Personal Time (to get a drink, etc.)	0.05
Fatigue (rest)	0.10
Delays (breakdowns, adjustments, running out of material, etc.)	0.05
Standard Time Per Piece	1.20 Minutes

Setups requiring considerable time are treated as separate operations. They're rated against standards that were established in the same way as those applying to production. Work, personal time, rest, and delays are included. Result: The workman's earnings aren't penalized on days when orders are small and runs are short.

If it takes 1.20 minutes to make one piece, standard production is 50 pieces an hour or 400 in an 8-hour day. Applying the Edwards formula, you'll get this distribution of the worker's 480 minutes: Actual producing time, 400; personal time, 20; fatigue, 40; delays, 20.

Increased production can add dollars to metalworking's too-low profits. Here's how it can be done

OUTPUT per manhour can't be boosted without applying sound engineering principles, believes Paul Edwards & Associates, a Pittsburgh management consulting firm. A client agrees: "Edwards helped us boost our strip mill's output from 350 tons a turn to 900."

No Pat Answers — Avoiding readymade systems, the Edwards organization claims only that it knows engineering ("We don't have to bargain about the facts") and knows steel ("We talk the men's language").

Partners Paul Edwards, Carl Davis, and John Vanderslice have done many production jobs themselves.

Their approach to boosting productivity has three well-defined stages.

First, they study the manufacturing process to find the "key control factor," whether it's a man or a machine. Needed changes are made in methods, machine placement, jigs and fixtures, or material handling. "Once we get things running right, we time everything that happens in an 8-hour day," says Mr. Davis, "then we can make allowances for machine adjustments and other delays in setting our standards."

"Effective" Use—In the second stage of their work (setting standards) the partners pay little heed to capacity figures claimed by machinery makers. "What we're after is the effective use of equipment," says Mr. Vanderslice. "We want to know what kind of performance we can reasonably expect from a man operating a machine, not what a machine could do if conditions were perfect. To get nameplate capacity from a furnace, you need a precise quantity of Btus and a specific atmosphere. We think in terms of practical capacity. If a man can deliver 85 per cent of the figure we set, we'll pay him a bonus."

When he's not held back by the

How To Boost It . . .

SAYS PAUL EDWARDS: "We try to establish standards which permit the average qualified workman to earn a 35 per cent bonus on unrestricted jobs (where he's not held back by the machine or process) through extra effort and without endangering his health or safety."

In the example cited, the workman should be able to beat the daily quota (400 pieces) by 140. If he turns out 540 pieces (equivalent to 10.8 hours of production at the standard rate) in 8 hours, he'll be paid for 10.8 hours.

Productivity can be boosted three ways: 1. By improving manufacturing methods (making machines and crews more efficient). 2. By setting production standards (including incentives). 3. By foremanship (production planning and control).

Here's the Edwards procedure:

- Study the job. Make sure it's being done the best way. Organize supervision and the flow of work.
- Specify the methods.
- Set production standards and wage incentives, if applicable.
- Explain and sell: a. To management and supervision. b. To union and employees.
- Demonstrate: a. Conduct production studies. b. Eliminate or reduce delays. c. Encourage operators to produce.

machine or process, the average qualified workman should be able to earn a 35 per cent bonus without endangering his health or safety, the partners believe. Bonuses are on a "1 for 1" basis: A 1 per cent increase in pay (calculated on the hourly base rate) for each 1 per cent increase in production.

No Horse Trading—"Standards can't be negotiated in the usual bargaining sense prior to installation," the partners emphasize. "The employer must not accept and the union should not request a policy under which job standards are agreed to before they are installed. The only practical means of checking a standard is by applying it to a job where the operators are willing to make a fair test of its correctness."

"The unions usually want standards right from the start," Mr. Davis explains, "but I've tried to win their confidence. Instead of doing a 'quick and dirty' job, I've had some machines running for eight months without standards. Once established, they'll be retroactive."

Selling the Standard — After a standard is set, the partners tell management what they did and why.

How do workers react? Usually by saying, "What the hell? We've been working on this mill for ten years. Are you trying to tell us we don't know how to run it?" To overcome this attitude, Mr. Edwards and his colleagues must prove that their standard is fair and that it will enable the operators to make more money than they previously did.

Making It Work—"The job of boosting productivity is less than half done when the standards have been set," Mr. Edwards cautions. "If a workman doesn't make the bonus we told him he could, he's going to be disappointed. We've got to find the reason. If something has to be changed, we don't wait for the grievance procedure. We take it up with management."

Selling the union is often difficult, the consultants admit, but labor leaders sometimes respond to the argument that living standards won't rise until there are corresponding gains in productivity. "We've found that most workmen want other people to produce more," says Mr. Vanderslice. "In group operations, we try to get them to say, 'Get off your fanny. You've got your hand in my pocket.'"

Problems—"We tangle with management most frequently when they have a penurious outlook," say the partners. "They expect high production from low incentive pay.

"Unions are most hostile in plants that have had weak management. If they've had their way for a long time, they don't want us upsetting the applecart.

"There are places where we can do nothing. Some contracts tie management's hands so securely that it's almost impossible to boost productivity."

Results—"In going to an incentive system, we expect to double productivity per manhour on a broad average," Mr. Edwards asserts. "By stepping up output, we can sometimes eliminate a turn (saving the costs of supervision and keeping the plant open) or make new equipment unnecessary."

Mr. Edwards cites the case of the client who developed a machine that would produce 15,000 pieces a day. "They were operating it with ten men and were ready to pay an incentive," he explains. "We nipped that in the bud by showing them how they could operate it with four men and produce 17,000 pieces (by combining and rearranging duties). If they redesigned the machine (centralizing controls and feeding station), they could run it with three people."

• *An extra copy of this article is available until supply is exhausted. Write Editorial Service,* STEEL, *Penton Bldg., Cleveland 13, Ohio.*

What Did the 85th Congress Get Done?

SUCCESSES outnumber failures in the second session of the 85th Congress. Heading legislation important to metalworking: Extension to 1962 of the Reciprocal Trade Agreements Act (with an amendment allowing Congress to force the President, by a two-thirds vote, to follow Tariff Commission decisions on escape clause cases); extension of the Renegotiation Act for six months rather than two years (and the promise of a complete re-evaluation of the subject next year); passage of a $39.6 billion defense budget (almost $1 billion more than Ike requested); help for small business' depreciation problems; a speedup in the highway program; easier mortgage money for the housing industry; help for the railroads; a bigger budget for atomic power development; statehood for Alaska (Hawaii probably will be a shoo-in next year).

Failures include the lack of new labor legislation, and the extension of corporate taxes at the old rates with no provision for better depreciation laws. The outlook for action in 1959 is dim since the 86th Congress is certain to be more Democrat dominated than the 85th.

The session did not lack politicking. Sen. Estes Kefauver (D., Tenn.) won the championship with his attack on the steel industry.

Conversely, one man stood out among the Democrats as a legislator: Rep. Wilbur Mills (D., Ark.), head of the Ways & Means Committee. His interest in better depreciation and renegotiation laws must commend him to business. His handling of corporate taxes, trade agreements, and over-all economic legislation kept in tow some of the more liberal Democratic element.

What Will the 86th Be Like?

Another leading Democrat, Sen. George Smathers (D., Fla.), who provided the steam behind the railroad bill, makes this prediction about the next Congress: It will have 10 to 12 more Democratic senators than this one (including two from Alaska). On the House side, some Democrats expect to pick up 40 seats, some think 60 are more likely. By November, they will no longer have economic decline on their side, but they promise to make hay with Republican Mideast policies and Ike's budget-minded attitude toward missiles, space weapons, and atomic power.

Sen. Warren Magnuson (D., Wash.), sounded the keynote for the attack on the Republican conception of a balanced budget: He described Ike's veto of the atom powered ice breaker as a "crippling, perhaps crushing blow to Arctic research and nuclear research. Russia may now have a free hand" in the Arctic.

Defense Budget Finally Agreed On

Here is the hardware money for defense authorized for appropriation by Congress in fiscal 1959: $1.7 billion for Army equipment and missiles; $2.9 billion for naval aircraft and related procurement and facilities; $2.8 billion for shipbuilding and conversion and facilities; $750 million for naval ordnance and facilities; $8.9 billion for Air Force aircraft, missiles, and other procurement. Research and development budgets are: Army, $500 million; Navy, $825 million; Air Force, $750 million.

Those figures do not include appropriations to the new National Aeronautics & Space Administration. T. Keith Glennan, president, Case Institute of Technology, and a former member of the Atomic Energy Commission, will head up NASA. His deputy: Hugh Dryden, chief of the National Advisory Committee for Aeronautics.

Partisan Approach to Foreign Investment

Sen. Jacob Javits (R., N. Y.) is pushing the idea of a World Development Corp., which would sell stock (largely to small investors) and build plants and facilities in the underdeveloped noncommunist nations. Intial capital of $100 million would come from the U. S. Treasury. The senator reports Leon Keyserling, Harry S. Truman's chief economist, assisted in forming the investment plan. (Mr. Keyserling will probably assume a leading role in the nation's economic planning if a Democratic president is elected in 1960.)

Senator Javits deplores the fact that of $62 billion in grants and credits sent overseas since World War II, only $5 billion went to underdeveloped countries.

The proposal will most likely receive backing from a large segment of business. A nonferrous spokesman in Washington (speaking about the Mineral Subsidy Bill) told STEEL that the metal industries do not generally desire direct government aid, but prefer the U. S. to encourage growth of foreign markets, while domestic markets remain oversupplied.

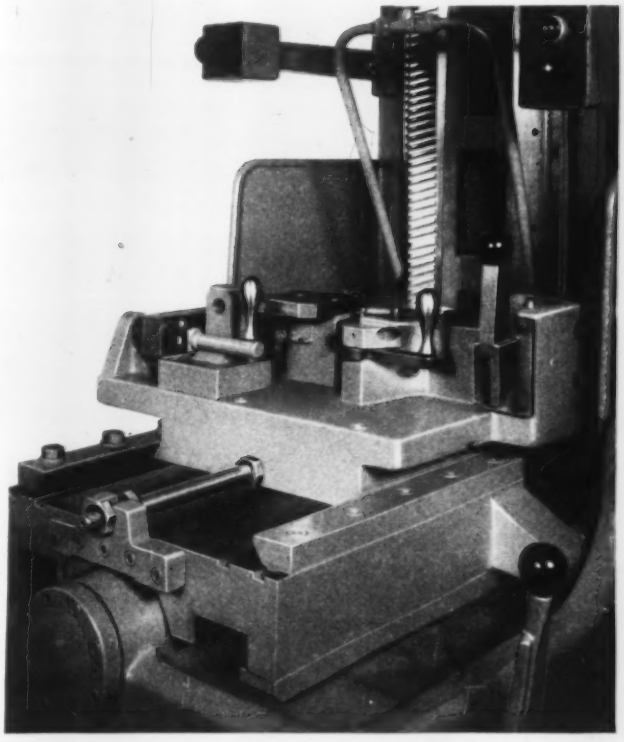
Capitol Notes

Reductions in the list of items restricted for shipment to Iron Curtain countries will come soon from the Commerce Department . . . Commerce's Foreign Technical Information Center will provide you with Russian scientific journals translated into English . . . Applications for Federal Housing Administration mortgages hit an all-time high in July (108,600 dwelling units including 92,700 single family homes).

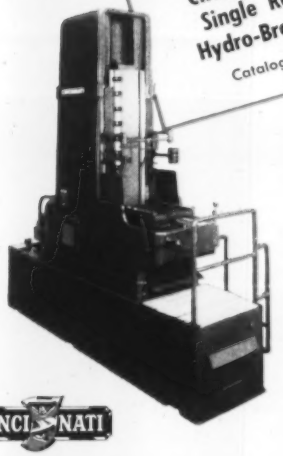
Cincinnati Equipped Hydro-Broach Machine

Completes 2 operations each stroke of ram

One sure-fire way to reduce costs . . . make the cutting stroke of the machine perform two or more operations. Key to the problem is ingenious tooling **and** the correct size and type of machine for the operation. Cincinnati Broaching Specialists combined these two requirements to broach the half-round notch and 90° surfaces on two sizes of contact arms, one of which is illustrated below. ¶ Production and cost requirements dictated a manually operated fixture. It has two stations, and the work progresses from left to right . . . 90° surfaces broached in the left-hand station and half-round notch in the right-hand station . . . one part completed each stroke of the ram. Cincinnati Engineering Service and CINCINNATI Hydro-Broach Machines are tops for low-cost replacement equipment and new tooling for new products. Many examples are illustrated in brochure M-1599-2, "How to Step up Production with CINCINNATI Hydro-Broach Machines." Write for a copy.



Two operations are completed each stroke of the Hydro-Broach ram. The fixture, a Cincinnati Engineering Service design, is a two-station progressive type.



CINCINNATI No. 5-42 Single Ram Vertical Hydro-Broach Machine
Catalog No. M-1745-1

CINCINNATI

Close-up of part. Heavy lines indicate surfaces broached.

Production data:

Part name	Contact arm
Material	Aluminum bronze
Operation	Broach 90° V and small radius
Production	130 per hour

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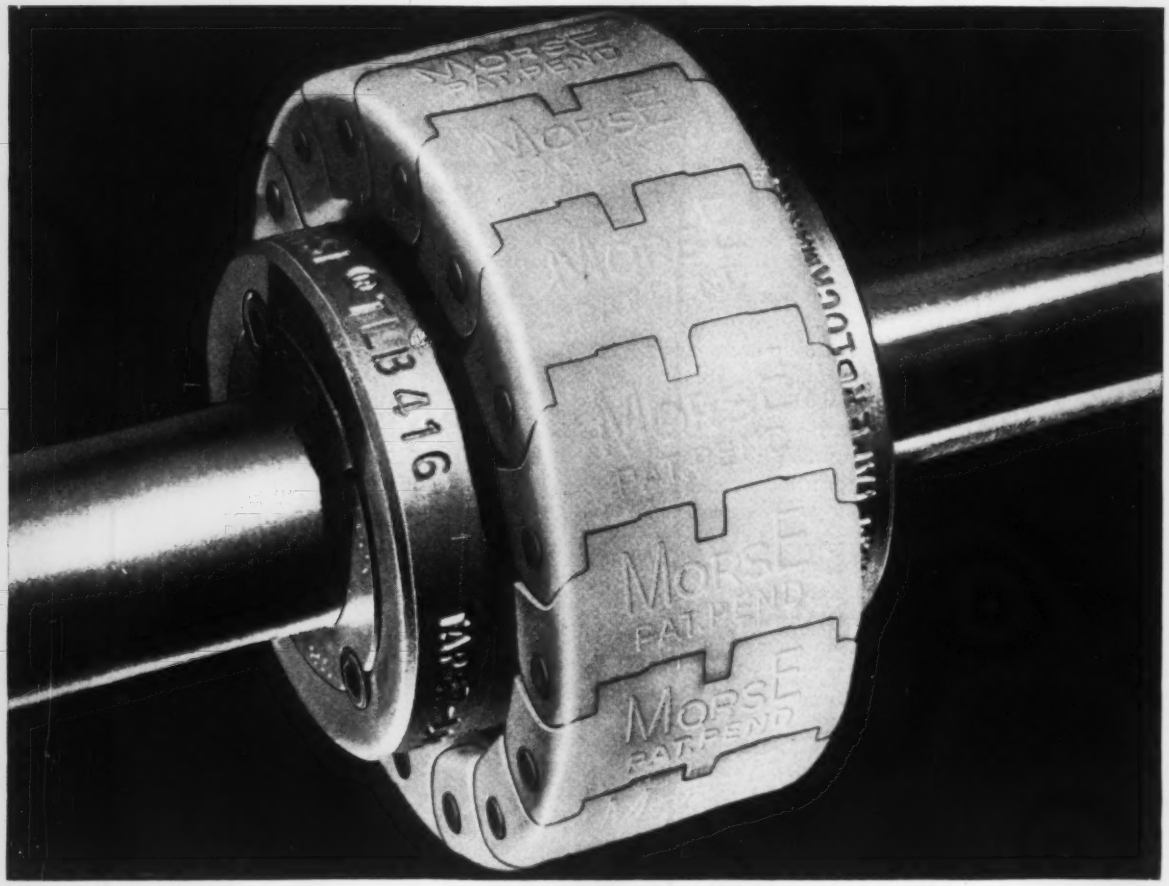


New Nylon Couplings

Cost 20% less, need no lubrication, last indefinitely!

New Morse Nylon Flexible Couplings cost less to buy and maintain than steel couplings. They use economical, stock roller chain sprockets—need no protective cover. They last longer, too . . . operate without lubrication because friction and wear are negligible.

Order complete couplings—½" pitch links plus stock sprockets (plain, finished bore, or taper-lock)—or buy just the links and use your own sprockets. Morse Nylon Couplings, made of Du Pont "Zytel" resin, are ideal for loads from fractional to 40 h.p. and speeds from 500 to 5000 rpm. And they adjust to misalignment.

For facts on Nylon Couplings, or the other couplings in the most complete line ever offered, call your local Morse Distributor. He's listed in the Yellow Pages under "Power Transmission". Or write: MORSE CHAIN COMPANY, DEPT. 2-88, ITHACA, NEW YORK. Export Sales: Borg-Warner International, Chicago 3, Illinois.

IN POWER TRANSMISSION
THE TOUGH JOBS COME TO

MORSE BW* BORG-WARNER

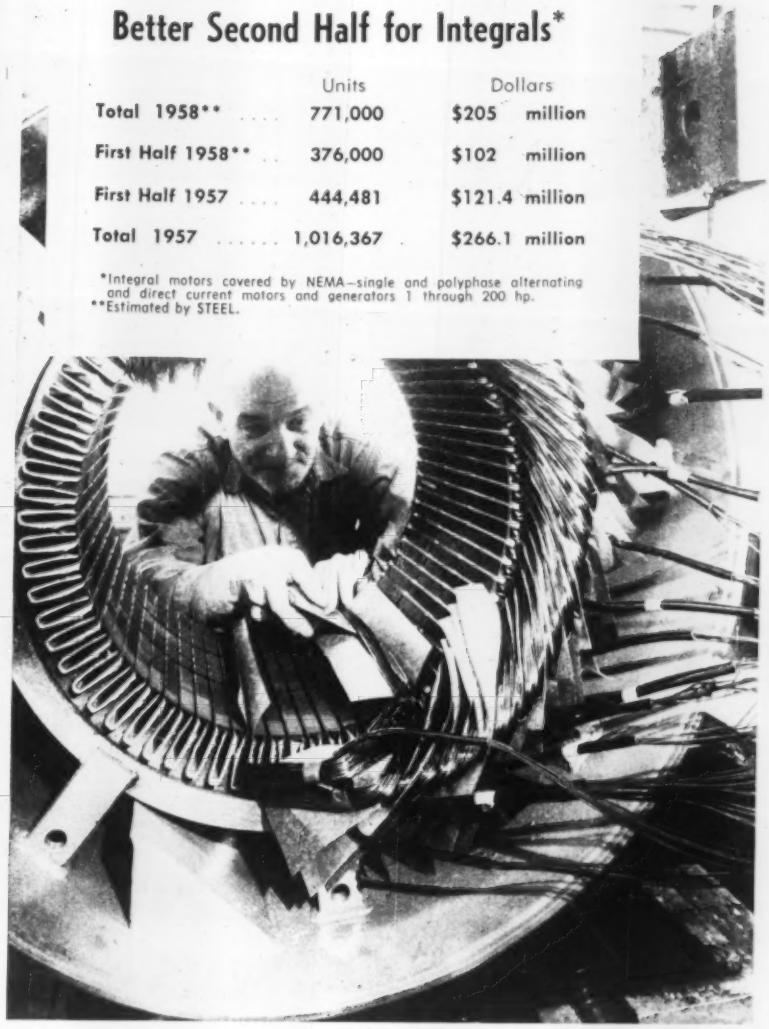
*Trademark

REMEMBER: Only Morse offers all four flexible couplings: Chain, Morflex and Radial, Morflex and Radial Driveshafts, and Nylon

Better Second Half for Integrals*

	Units	Dollars
Total 1958**	771,000	$205 million
First Half 1958**	376,000	$102 million
First Half 1957	444,481	$121.4 million
Total 1957	1,016,367	$266.1 million

*Integral motors covered by NEMA—single and polyphase alternating and direct current motors and generators 1 through 200 hp.
**Estimated by STEEL.



General Dynamics Corp.

Motors are more efficient, lighter, and more powerful as . . .

Technology Boosts Integrals

TODAY'S integral horsepower electric motors pack more power into smaller frames, withstand higher temperatures, and operate more efficiently in corrosive and erosive atmospheres. Technical advances are responsible.

Frame Sizes—The National Electrical Manufacturers Association is winding up the second phase of its project to establish standards for smaller frame sizes (the first phase covered 1 to 40 hp, the second, 40 to 150 hp). Manufacturers report they are speeding the job of rerating to the NEMA frame relationships, although many have not completed transition to the new dimensions in all horsepower ratings.

The switch to smaller frame sizes will continue. One maker says: "With the major rerating program on standard motors coming to a close, it is unlikely the industry will redesign motors again for perhaps four or five years. But there will be a continuing trend toward smaller frames for special application motors because of the benefits to machinery designers and the need for higher horsepower."

New Insulations — Many makers say this is the most significant development. Better insulations give motors: 1. More horsepower from smaller frames. 2. Longer life. 3. Ability to withstand higher temperatures, corrosion, and erosion. 4. Greater moisture resistance.

Other Examples—A Great Lakes area manufacturer says it is broadening its line of electrical and mechanical variable speed units. A midwest company has developed direct current types said to be interchangeable with the alternating current frame sizes. An eastern firm has a wound-rotor motor said to be "30 per cent lighter, four frame sizes smaller than the old NEMA standard, and more efficient" than the original unit.

Westinghouse Electric Corp. has introduced what it says is an entirely new concept in packaged ac adjustable speed drives. One feature allows the dc motor to convert the slip power to mechanical power output.

Several companies market silicon rectifiers and electronic tubes which convert ac to dc for variable speed control. Proponents say such systems are hardier, smaller, and more efficient than motor-generators.

Trend—Says an eastern company: "There's a definite movement toward engineering motors for specific applications. Special engineering often results in reducing the size, improving the performance, lowering the cost, and improving the appearance of the machine using the motor."

More Services — Along with improved products, motormakers are offering added extras to customers. Commonly included are: 1. A list of renewal parts. 2. An inspection and maintenance plan. 3. A report of critical equipment condition. 4. Recommendations as to which unit to use in a given situation.

Reliance Electric & Engineering Co., Cleveland, says its new distribution system allows one-day delivery in all major market areas. Another service: Upon invitation, Reliance will list all replacement motors a company should have and then stock them at a nearby ware-

house, ready for emergencies.

Several makers report a growing trend to bypass distributors, handling sales themselves.

Sales Off — Integrals have been hard hit by the recession. Company estimates show first half sales 10 to 40 per cent under those in the first half of 1957.

Makers believe most of the drop was in the last few months of 1957 and in the first five months of this year. Consensus is the second half will be about 5 per cent better than the first, but that 1958 will still be substantially under 1957 (see table, Page 57).

No real upswing is expected until the first of the year.

Sums up one manufacturer: "The greatest declines have been in cranes and hoists, other material handling equipment, compressors, and machine tools. Orders for smaller equipment, such as fans and blowers, pumping equipment, and heating and cooling equipment, have not declined as much."

Manufacturers pin their hopes for an upswing on these industries: Oil, chemicals, construction, plastics, rubber, printing, electronics, missiles, and aircraft. "Orders from machine tool builders should pick up in the fourth quarter and show much improvement in 1959," says one company.

New Markets—One of the best is defense. Says an eastern firm: "The increased emphasis being put on missiles and remote radar stations promises a quickly developing market for induction motors."

Wagner Electric Corp., St. Louis, sees hermetic and semihermetic motors as showing great promise. Example: They're going into bigger and bigger refrigeration units (which formerly used standard motors).

Prices—Even though makers have been hit with higher labor and material costs this year, most motors are cheaper than they were in 1957 because competition has led to widespread unofficial price slashing.

The latest cut was in July when many manufacturers quietly dropped prices 6.5 to 17 per cent (depending on the size motor). Some feel the price situation will have to strengthen soon. Reason: Some sales are just above cost, some under.

But don't look for any early hike in published price lists.

Phone Selling Proved

AN AGGRESSIVE telephone sales campaign during the rugged first half has enabled Rolled Steel Corp., a Skokie, Ill., warehouse, to practically equal its performance of the same period last year.

Most warehouses suffered a 25 to 30 per cent decline during the first half.

Stress on Basics—Rolled Steel did the job by emphasizing a few basics (see checklist) and injecting enthusiasm into its salesmen via brainstorming.

"Our products fit the telephone technique," says Seymour Waldman, president. "Steel is bought by specifications—they're the same regardless of the supplier. All we have to offer are service, material availability, and price. We've found that purchasing agents like telephone sales calls because they take less time than office calls."

Few Personal Calls—The only personal calls Rolled Steel salesmen make are to get acquainted with potential customers. "There are two exceptions," Mr. Waldman points out. "We have salesmen making personal calls in the Minneapolis-St. Paul and Salt Lake City (Utah) areas. They are necessary. Other than those, telephone salesmen in the Chicago and Houston branches cover an area ranging from Ohio to Colorado and from Canada to the Gulf."

Big Phone Bill—In Chicago, 18 salesmen average 20 calls each per day. Because of the volume (monthly phone bills run $10,000 to $12,000), the firm has its own substation with 64 trunk lines. About 1000 customers are contacted each month and about 4000 are regularly served each year.

A blackboard (see picture) covering three walls gives the salesroom a stock exchange atmosphere. Inventory data (in color coding) are changed as stocks or orders are

Tips for Telephone Selling

1. Keep your approach cheerful; always have something pleasant to say.
2. Appeal to the individual's self-interest—either in his job or personal life.
3. Plan your call in advance; know what you're going to say.
4. Anticipate all possible objections and be prepared to answer them in a positive manner.
5. Be sure your prospect is free to talk. If he isn't, call back at a more convenient time.
6. Make sure you pronounce the names of the customer and his company correctly. As your relationship improves, your ability to call him by his first name will cement relations.
7. Be sure to properly identify yourself and your company.
8. Be pleasant to secretaries and try to develop their friendship.
9. Never argue. Even if you feel you're right, back out gracefully and maturely and call at another time.
10. Don't talk too much.
11. Always ask for the order.
12. Don't ask him to call you back. Arrange to call him later.
13. Take a break between calls. Prepare for the next call by writing notes so that confusion between calls is impossible.

Potent Sales Booster

received. At a glance, each salesman can determine product availability. The firm's emphasis is on primary and secondary sheets. (Secondary sheets account for about 60 per cent of its volume.)

Brainstorming Helps—"We tried brainstorming about six months ago," says Ralph Herdrick, vice president. "The salesmen took to it immediately. At first, we had three weekly sessions, then went to once a month."

Here are some suggestions which have paid off:

- Better methods of completing order forms have saved 20 man-hours per month.
- The pneumatic tube system (carrying paperwork between the plant and offices) was improved to get information from the receiving department to the inventory recorder at the blackboard faster.
- The IBM system was expanded to permit immediate pinpointing of prospects for special offerings. If a mill or other source offers Rolled Steel a shipment of a special product, the IBM will immediately provide the names of all customers who can possibly use the material and the salesmen call immediately. Printing facilities make it possible to get flyers to all other prospects within hours.
- Salesmen help customers pool shipments to save freight costs. On less-than-car or truck load shipments, a salesman can often suggest combining one customer's order with another's in the same area to gain a cheaper shipping rate. "Most are happy to adjust their shipping schedules to get the savings," says Mr. Herdrick.

Pictures Useful—To help personalize salesman-customer relationships, each salesman affixes his picture (postage stamp size) near his signature on letters.

Rolled Steel Corp.'s monthly newsletter to customers and prospects features a picture and personality-type story about one of its salesmen.

Pay and Workweek Grow

Steelworkers' pay rates set records even before the July wage increase, the American Iron & Steel Institute reports. Average payroll cost for hourly employees hit a new high of $3.11 in June, compared with $3.10 in May and $2.86 in June, 1957. Costs of pensions, social security, insurance, and supplemental unemployment benefits are not included. These expenses average over 30 cents an hour.

Employment advanced in June, although total payroll remained below year-ago levels. AISI members had 510,828 salaried and hourly employees in that month, compared with 500,369 one month earlier. Average workweek grew from 34.2 hours in May to 35.5 hours in June. A $266.1-million total payroll in June this year contrasts with disbursement of $310.2 million one year earlier.

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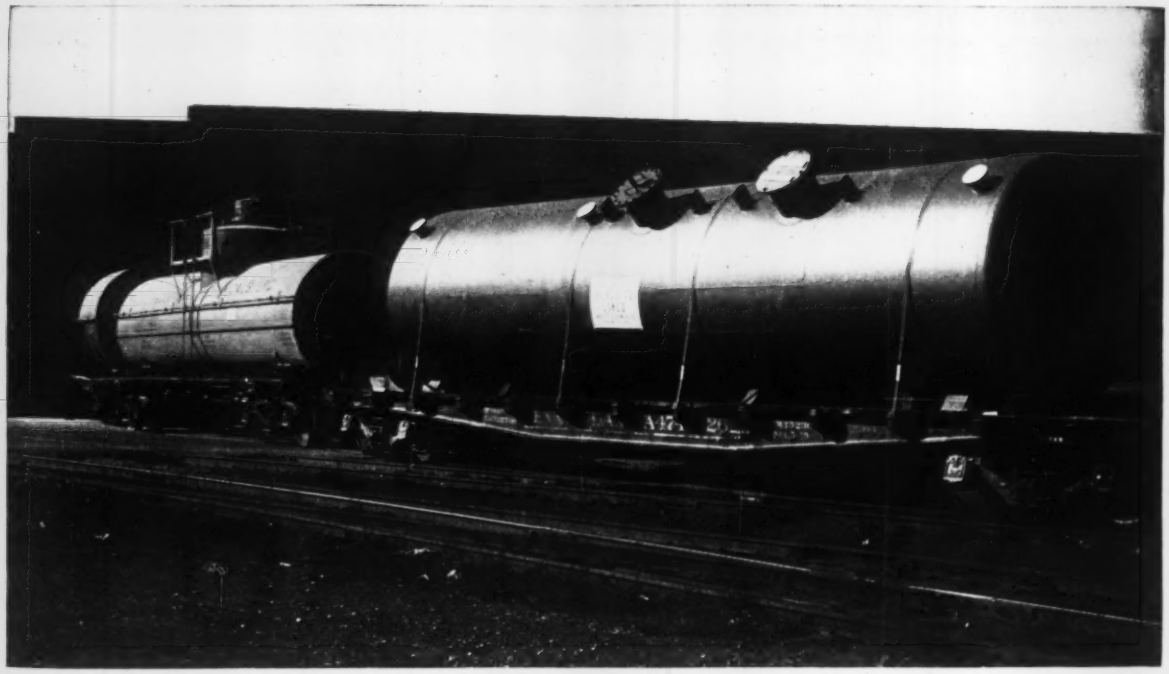

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Detroit Still Asks: Will Small Cars Pay?

One reason why automakers hesitate to introduce small cars: The typical firm would have to sell around 167,000 of them each year to break even. Take the case of Allmotor Co. and its Midget (both company and car are fictional but typical). Total cost of bringing out the Midget (excluding direct labor and material) would be about $250 million. Allotting a $500 development cost per car, Allmotor figures it would have to sell 500,000 units. Amortized over three years, that's 167,000 unit sales needed annually. Where would that large a market be found? Here's the most likely possibility:

Discontinue own imports	15,000
Drop a series	121,000*
Capture from foreign makes and expanding market	46,000
Total	167,000

Even if Midget gained all 121,000 after dropping of the Allmotor Brassy Six (a model in the lowest-priced Ford or Chevy class) and 46,000 buyers of foreign cars, the company would only break even. It would have to find a new group of buyers to show a profit. Detroit is looking to its market researchers for guidance.

* Adapted from *Ward's Automotive Reports.*

Carbuilders still aren't sure they want to enter the small car field. If no market develops, they could be stuck with a collection of unamortized tools

SMALL CARS are still the hottest topic of conversation in autodom's nonlabor circles. One question comes up frequently: What do Ford and GM have in the works?

The cars aren't in the Volkswagen or Renault category. But they are smaller than anything the Big Three are making. They are closest to American Motors Corp.'s Rambler in size and performance and supposedly will fill the price gap between imported cars and higher priced Fords, Chevrolets, and Plymouths. It's expected that the Plaza (Plymouth), Custom 300 (Ford), and Delray (Chevy) series will be dropped in their favor.

No Comment — To questions about economy cars, the Big Three maintain a bland silence, saying only that "it's a possibility," or "it's being studied," or "it looks interesting." Ford and Chevrolet officially won't admit tooling orders are out—although it is a much discussed industry fact.

Reasons for the silence: 1. Carbuilders still aren't sure this is a step they want to take. If the market folds, the projects could be dropped even though tooling has been bought. 2. Industry tradition forbids talking (officially) about coming designs. 3. The industry knows that silence breeds speculation which is a choice avenue of publicity.

Question—There's a lot of talk about what kind of people buy these cars and what they expect from them, but nobody seems able to answer the key question: Will the potential market justify the cost? In the U. S., it costs almost as much to build a small car as it does a large one. If the market doesn't develop, carmakers could be left with a collection of unamortized tools and other costs that would be tough to absorb.

One company executive suggested to STEEL that a ratio between maximum cost and minimum sales might indicate how many cars a company will have to produce and sell to make the venture pay.

Example — Let's take a look at Ford's pending economy car. Detroit knows Ford has placed tooling orders for an L head, 6 cylinder engine (125 hp), with a cast iron block and overhead valves. Displacement has been reported as 144 cu in. The car will apparently have a 106-in. wheelbase and is expected to use the inexpensive, two stage automatic transmission that will be introduced on some Fords this year. Last reports say it will have front end drive, mainly because Ford feels that (with a conventional en-

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gine) it needs something different to keep pace with the radical engine Chevrolet is tooling.

It has been suggested that Ford's tooling costs will run about $50 million, but that doesn't begin to cover expenses. When Edsel was introduced, the company admitted spending $250 million to bring it to market. Say that's the maximum Ford will spend on marketing its economy car. It costs $1500 to build a car in the Ford and Chevy class—about $1000 of it goes for direct labor and materials. The other $500 goes to pay off the $250 million investment (see STEEL, Dec. 9, 1957, p. 113).

Break Even—It means that Ford must sell 500,000 cars to break even. If the manufacturer's cost is $1500, the dealer's cost will be about $1750 (which includes the company's profit margin). If the costs are amortized over three years, Ford will have to sell an average of 167,000 cars annually to make the economy car pay. Fairly reliable reports indicate the company is thinking in terms of 150,000 units a year.

Where will sales come from? The company will probably stop importing its British Fords and the German Taunus which will give it a potential 15,000 unit market as things now stand. In addition, the lower series of Fords will be dropped. If the same class of Chevrolets and Plymouths go, too, it means a potential market of some 480,000 units if the yearly production figure is 5 million to 6 million cars.

Not all the people who buy lower priced cars will want the economy model. Probably about a third will move into the Ford Fairlane class or higher. But under traditional penetration goals, Ford can be expected to get a third of the remaining 320,000 potential buyers. That's another 106,000 units.

Ford's economy car now has a chance of picking up 121,000 units. It needs 167,000. The rest must come from the over-all market growth, from other imports, and from Rambler and Studebaker buyers.

Too Pessimistic—That thinking is based on minimum sales and maximum costs. Autodom doubts that Ford will spend more than $150 million on its smaller car, particularly since a dealer organization is already available (unlike Edsel). With few annual changes, tooling costs can be amortized over a longer period—maybe five years.

It's likely that many of the present low volume imports will be forced out of the market when Ford and GM make their moves. Finally, the growing car market of the 1960s automatically will boost sales even if demand for economy cars never rises above 8 or 9 per cent of the market.

Is Aluminum Too Costly?

General Motors has a cost problem in bringing out an economy car: Making an aluminum engine block as inexpensively as a cast iron block.

Chevrolet Div. has released tooling orders for a flat opposed, air cooled, 6 cylinder engine that will have an aluminum block with cast iron liners. Contrary to some reports, the block will be permanent molded—not diecast. The presence of liners makes it unlikely that GM is seriously considering using high silicon aluminum for the block—at least now. One report has it that some blocks already have been cast at Chevrolet's Tonawanda, N. Y., plant. Engine production is tenatively scheduled to start in January.

Competitive?—The aluminum industry hints that the light block will be competitive in cost with a cast iron unit despite the price differential in raw materials. Claims one official: "It's cheaper to cast a large aluminum part than a small one. Small castings cost about 60 cents a pound, but larger ones (engine block size) can be made for 40 to 45 cents a pound." The figure is still high when compared with 6 to 12 cents a pound for gray iron castings, but, apparently, here's what GM is doing to knock down its costs.

First—The block is designed so relatively little machining is needed to finish it.

Second—Chevrolet reportedly is developing a casting line that will require little direct labor. There is talk of automatic cycling and underpouring techniques to avoid metal turbulence.

Third—GM's molten metal contract with Reynolds Metals Co. allows it to schedule metal flow so that considerably less money needs to be tied up in raw materials. The quick turnover helps cut piece prices.

Fourth — It's understood that Chevrolet is avoiding rejects by setting up a quality control program to make sure the molten aluminum will be as pure as possible when it is poured. One source says the hot metal goes into a 5000-lb ladle, then into a 30,000-lb holding furnace. From there it moves to a second ladle with a capacity of 2000 to 5000 lb, then into a similar size holding pot before it's poured. The metal is chlorine fluxed and checked regularly between each transfer. Chevrolet will use nitrogen in places where chlorine is a hazard.

U. S. Auto Output

Passenger Only

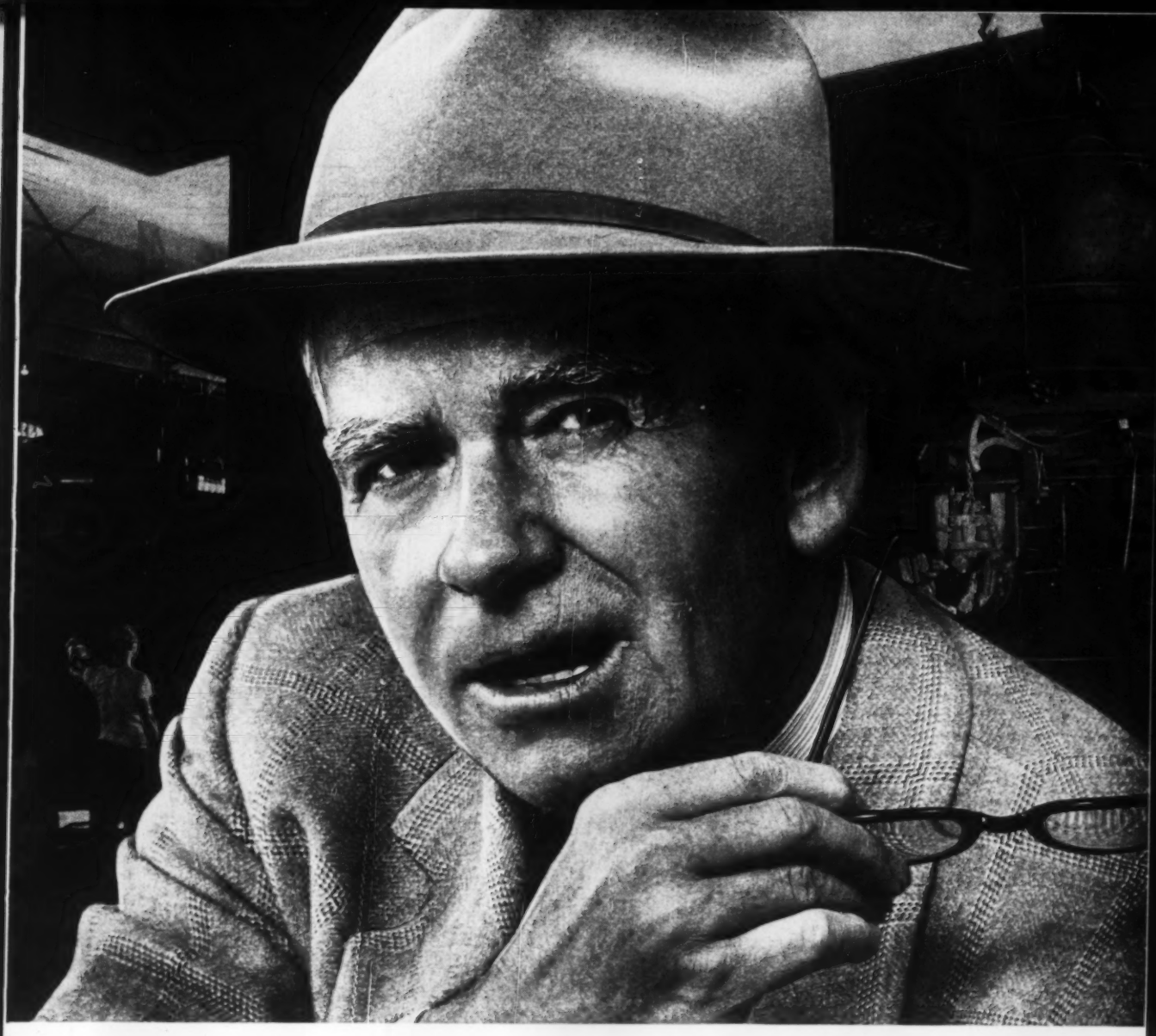
	1958	1957
January	489,357	642,090
February	392,112	571,098
March	357,049	578,826
April	316,503	549,239
May	349,474	531,365
June	337,355	500,271
July	321,053	495,628
7 Mo. Total	2,562,903	3,868,517
August		524,354
September		284,265
October		327,362
November		578,601
December		534,714
Total		6,117,814

Week Ended	1958	1957
July 19	85,533	117,205
July 26	85,519	119,857
Aug. 2	62,846	119,323
Aug. 9	65,614	118,864
Aug. 16	59,900†	117,598
Aug. 23	35,000*	123,130

Source: *Ward's Automotive Reports.* †Preliminary. *Estimated by STEEL.

Exhaust Notes

- Ford Motor Co. announces that prices on its Taunus passenger cars start at $2116 (standard, two door sedan) and go to $2471 (de luxe station wagon). The car is built by Ford of Germany and was first imported into California last week.
- Oldsmobile says that during the first six months it gained a 26,500 unit lead over its nearest competitor in the medium price field.
- American Motors Corp. reports that its dealers sold 104,677 Ramblers between Jan. 1 and Aug. 10 of this year. In 1957, 98,567 Ramblers were sold in the entire year.



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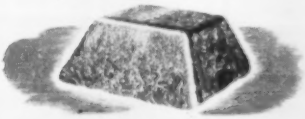

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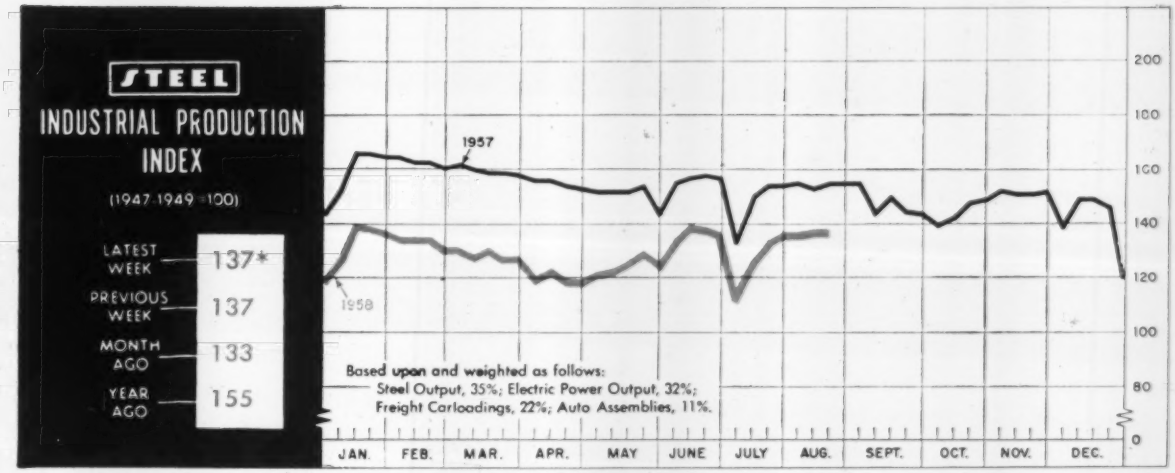


Week ended Aug. 16.

Construction: Recession Breaker in '58

THE CONSTRUCTION industry, which may rack up a few records this year, is going to be a big factor in the recovery from the recession, but its influence is likely to be less than it was in 1954-55. Reason: In that period, industrial building pulled capital equipment sales out of the doldrums. This year, the main emphasis is on public building.

After getting off to a slow start in the first quarter, the industry has more than made up the lost ground in the last four months. A special report by F. W. Dodge Corp. shows that construction contracts in the first three months fell 10 to 13 per cent behind the year-ago period. In April, the loss was changed to a gain of 4 per cent, with new monthly records following in May and June. This brought the first half total just 1 per cent shy of the corresponding figure last year, and indications are that July supplied the punch to put 1958 ahead of 1957.

Corroboration — *Engineering News-Record*, which tabulates contracts for heavy construction, shows an even more favorable picture. Through the first 33 weeks of 1958, those contracts come to almost $13 billion, 7 per cent ahead of the corresponding 1957 period, and the second highest total on record for the period.

Edwin W. Magee Jr., associate economist for Dodge, predicts a continuation of the uptrend through the second half of the year, resulting in a record total for 1958. Not all construction experts agree with him, though. One large midwest industrial builder feels that the cutbacks in plant and equipment expenditures will be too great to be offset by other private and public building. He says there is a great deal of work being considered now, but doubts that it will materialize this year. "It may break loose next year, though," he adds, "starting a gentle uptrend in this segment."

Records Coming—H. C. Turner

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	1,678[1]	1,632	2,101
Electric Power Distributed (million kw-hr)	12,600[1]	12,707	12,409
Bituminous Coal Output (1000 tons)	7,895[1]	7,775	9,588
Crude Oil Production (daily avg—1000 bbl)	6,850[1]	6,836	6,837
Construction Volume (*ENR*—millions)	$336.9	$514.0	$411.9
Auto, Truck Output, U. S., Canada (*Ward's*)	76,273[1]	81,066	146,258
TRADE			
Freight Carloadings (1000 cars)	620[1]	619	751
Business Failures (Dun & Bradstreet)	290	271	265
Currency in Circulation (millions)[3]	$31,291	$31,170	$31,069
Dept. Store Sales (changes from year ago)[3]	+1%	+3%	+3%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$21,239	$22,486	$19,242
Federal Gross Debt (billions)	$278.0	$274.6	$271.7
Bond Volume, NYSE (millions)	$24.1	$30.4	$17.7
Stocks Sales, NYSE (thousands of shares)	14,622	18,523	8,800
Loans and Investments (billions)[4]	$95.5	$93.5	$86.0
U. S. Govt. Obligations Held (billions)[4]	$34.2	$32.0	$24.8
PRICES			
STEEL's Finished Steel Price Index[5]	246.65	245.03	239.15
STEEL's Nonferrous Metal Price Index[6]	198.1	199.4	214.3
All Commodities[7]	119.0	119.2	118.1
Commodities Other than Farm & Foods[7]	126.0	126.1	125.6

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1958, 2,699,173; 1957, 2,559,490. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-39=100. [6]1936-39=100. [7]Bureau of Labor Statistics Index, 1947-49=100.

Coming . . . Sept. 1

IN

STEEL

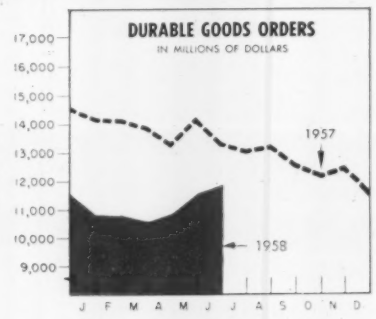
How To Control Costs

How do your costs stack up with competitors'? Gray Iron Founders' Society has a unique program to give its members that information on an anonymous basis.

STEEL will describe the program next week, showing how foundries use the cost comparisons to check their own performance and how the analysis has enabled them to make big savings. The Sept. 1 article will tell how such a program can be adapted for other industries.

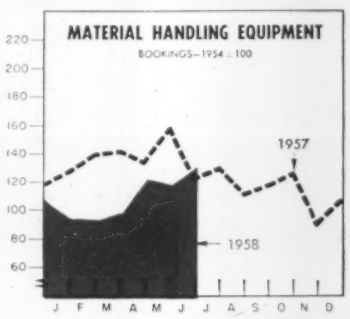
The study also reveals where costs usually can be cut and where most companies are in the best shape. It can show, too, unexpected strengths or weaknesses in an industry that can be exploited or remedied to aid in the battle with competing industries.

THE BUSINESS TREND



	New Orders* 1958	New Orders* 1957	Sales* 1958	Sales* 1957
Jan.	10.704	14.176	12.646	14.941
Feb.	10.688	14.102	12.038	14.808
Mar.	11.488	13.853	11.670	14.198
Apr.	10.833	13.234	11.532	14.254
May	11.423	14.115	11.643	14.296
June	11.785†	13.249	12.025†	14.207
July	.....	13.005	.....	14.573
Aug.	.....	13.160	.....	14.297
Sept.	.....	12.519	.....	14.132
Oct.	.....	12.154	.....	13.932
Nov.	.....	12.434	.....	13.548
Dec.	.....	11.399	.....	13.092

*Seasonally adjusted. †Preliminary.
U. S. Office of Business Economics.



	1958	1957	1956	1955
Jan.	93.07	126.34	122.43	97.00
Feb.	93.49	139.29	129.56	98.71
Mar.	97.89	140.76	166.14	149.16
Apr.	122.36	132.67	145.20	109.52
May	118.04	157.95	155.53	110.50
June	131.15	121.57	189.13	139.00
July	.....	128.31	165.50	111.76
Aug.	.....	110.09	168.70	106.20
Sept.	.....	116.79	130.35	136.80
Oct.	.....	124.80	143.38	123.52
Nov.	.....	87.80	138.50	118.09
Dec.	.....	105.65	117.76	139.85
Avg	.....	124.34	147.68	120.01

Material Handling Institute Inc.

Charts copyright, 1958, STEEL.

Jr., president of Turner Construction Co., New York, agrees with this view on industrial building. But he feels that the uptrend in private and public building, which will continue through this half, plus the firmness of commercial construction will more than offset the decline in industrial construction. This would mean a record dollar volume, and perhaps a new physical volume mark as well.

Work put in place is just now beginning to reflect the spring upturn in awards. Latest Department of Commerce figures show significant gains in July from both the previous month and year-ago totals. If this trend continues, last year's record of $48.5 billion is sure to fall.

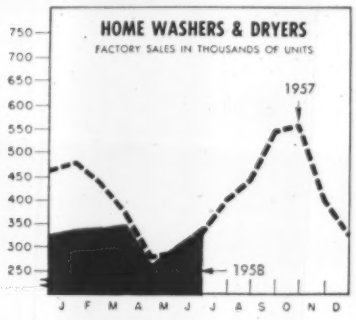
Price Situation—Many price indexes indicate that building costs have risen over 3 per cent in the last 12 months. However, most of those indexes are based on published prices, Mr. Turner explains, while actual costs may be somewhat lower. "Our own index last month was 315 (1939=100) compared with a 317 average for 1957. Labor costs have risen, but material costs have been forced down to meet competition."

If this continues, a physical record will be set.

For metalworking, this record will be of less significance than the lower figures of most recent years. Despite the fact that construction is now the biggest user of steel (based on figures for the first six months—see STEEL, Aug. 18, p. 131), total tonnage this year is off about 32 per cent from the comparable 1957 figures.

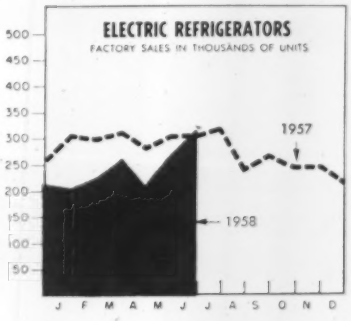
At the same time, industrial building was off 44 per cent. During the second half, this downcurve seems to have flattened out at about 30 per cent below comparable 1957 monthly totals, one observer claims, and it should hold at that level for the rest of the year. ("Look at machine tool orders and you see the parallel to industrial construction," Mr. Turner declares.) Even if contracts do level off, work put in place will continue to decline for a few more months, representing the lag time in this industry.

Still Important—But don't discount the effects of this year's construction pattern on the economy. The upturn in residential housing starts (at an annual rate of 1,160,000 last month, they were at the highest level since January, 1956) will have a favorable effect on the appliance, plumbing fixture, and other hardware industries. Now



	Washers		Dryers	
	1958	1957	1958	1957
Jan.	238,153	331,314	98,630	144,621
Feb.	263,099	319,580	78,578	114,517
Mar.	278,891	286,205	70,309	83,668
Apr.	224,896	230,675	38,475	42,850
May	262,999	254,195	41,898	31,572
June	288,831	282,289	54,173	46,783
July	.....	335,139	.....	70,011
Aug.	.....	329,046	.....	116,601
Sept.	.....	384,299	.....	164,468
Oct.	.....	369,487	.....	185,772
Nov.	.....	260,460	.....	141,663
Dec.	.....	206,787	.....	118,116
Totals	3,589,476		 1,260,642	

American Home Laundry Mfrs. Assn.



	Units		
	1958	1957	1956
Jan.	206,100	305,400	308,900
Feb.	228,800	298,700	316,000
Mar.	261,100	309,300	403,500
Apr.	210,800	281,600	353,300
May	262,900	303,700	346,800
June	316,300	305,100	354,400
July	.....	318,000	351,000
Aug.	.....	240,500	307,600
Sept.	.....	265,200	277,300
Oct.	.....	245,500	212,200
Nov.	.....	246,400	211,600
Dec.	.....	214,600	257,400
Totals	.....	3,334,000	3,700,000

National Electrical Mfrs. Assn.

that the highway construction program is gaining way, demand for road building materials will increase. Even without record industrial building, the industry is leading the economy out of the recession.

Break in Production Due

Since the last week in June, industrial production, as measured by STEEL's index, has paralleled the 1957 trend line but at a lower level. The pattern is about to be broken. Changeover shutdowns in the automotive industry hit the peak this week when Chevrolet Div. of General Motors Corp. phased out 1958 production. This was partially offset by initial '59 production of several other makes, but the real build-up of new model production is still several weeks off.

This drop in automotive output is too great to be counterbalanced by the combined efforts of small weekly increases in the other three elements of the index. Steel production during the week ended Aug. 22 is scheduled to increase for the sixth consecutive time. Electric energy output for the week ended Aug. 9 established a record for the second successive week, and it may be broken again if the weather stays warm. But any increase will be small. Freight carloadings have slipped in the last two weeks, but they won't vary enough to influence the index significantly.

The outlook: The preliminary reading of 137 (1947-49=100) for the week ended Aug. 16 will drop two or three points before August is over. It will drop sharply over the Labor Day week, then start back up in response to increased automotive production.

Business Optimism Gains

Greater sales, improved earnings, and more new orders are seen for the fourth quarter in comparison with the similar 1957 period, according to the latest survey of businessmen's opinions by Dun & Bradstreet Inc., New York. Most of the renewed optimism comes from executives in the metalworking industry, reports D&B. In addition, the survey shows that fewer businessmen expect to reduce inventories in the fourth quarter compared with the two previous surveys. Most executives (78 per cent) see level prices ahead, but of the remainder, the ups were three times as numerous as the downs.

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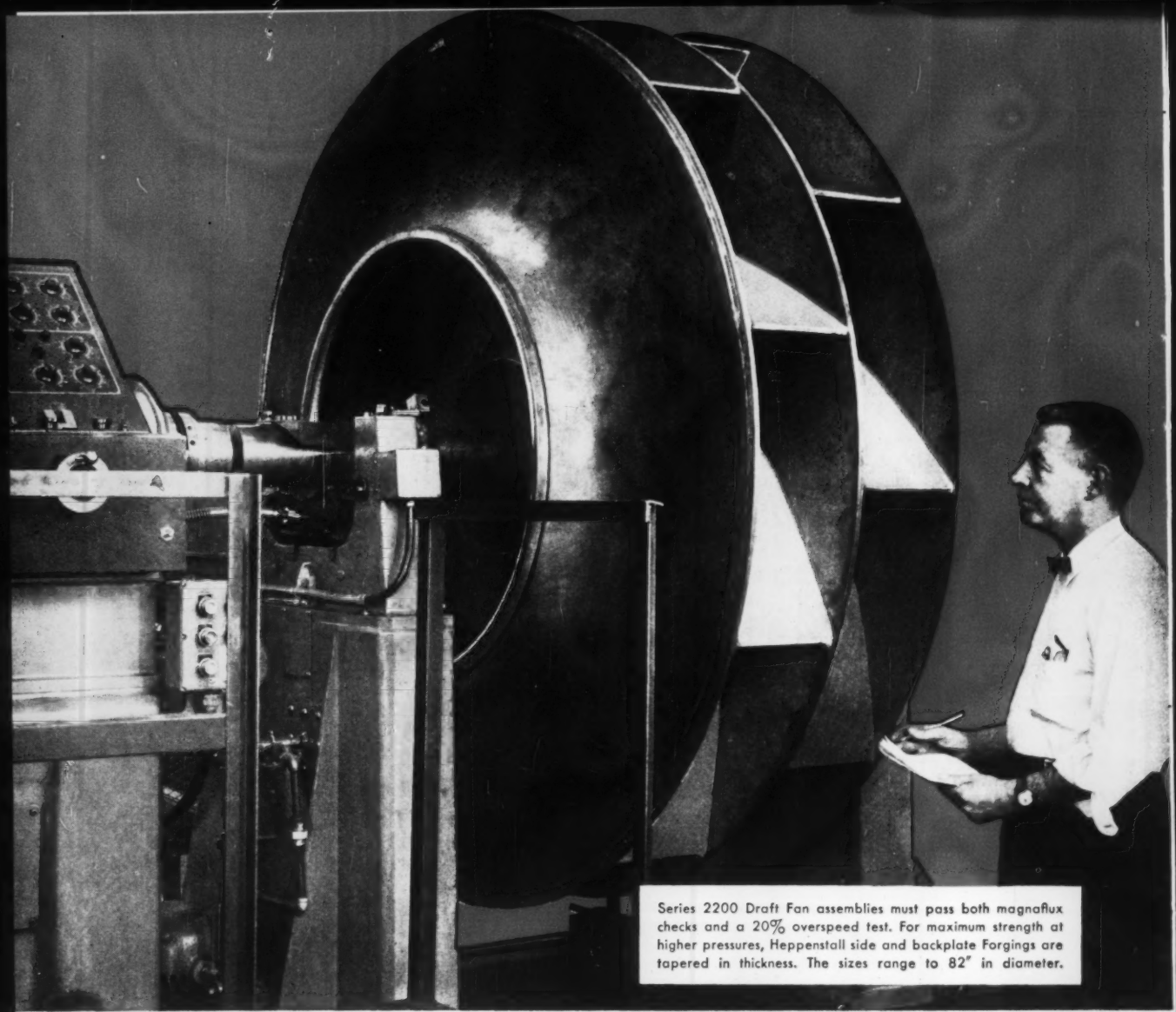

Series 2200 Draft Fan assemblies must pass both magnaflux checks and a 20% overspeed test. For maximum strength at higher pressures, Heppenstall side and backplate Forgings are tapered in thickness. The sizes range to 82″ in diameter.

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"We use Heppenstall Forgings for our Series 2200 . . . the forgings machine well and stand up under the various processes that we subject them to in preparing them to our specifications. When you combine quality with reliability . . . it answers our desires." So says Mr. J. E. McDonald, Manager of Engineering, Westinghouse Electric Corporation, Sturtevant Division, Hyde Park, Massachusetts.

In the series 2200, Heppenstall Forgings are used for the side plate, center plate with hub, back plate and fan shaft. This is the first fan ever to provide the advantages of "airfoil" blading to single stage blowers in a range of pressures from 45″ to 90″ of water, at motor speeds of 1800 RPM.

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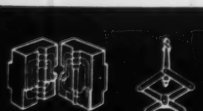
Find out how Heppenstall Forgings can build extra quality and performance into your equipment. Ask your Heppenstall Company Representative.



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MIDVALE-HEPPENSTALL COMPANY
Nicetown, Philadelphia 40, Pa.

JAMES E. IRVING
Irving Subway Grating pres.

JOHN F. MAHER
Reed Roller Bit pres.

HUBERT FRUEHAUF
Dow Chemical dept. mgr.

ROBERT ERICKSON
Beckman Instruments v. p.

James E. Irving was elected president of **Irving Subway Grating Co.**, Long Island City, N. Y. He was executive vice president.

Reed Roller Bit Co., Houston, elected **John F. Maher** president, replacing **Rex G. Hamaker** who is retiring. Mr. Maher was president of Oil Center Tool Co. **Ray O. Shaffer**, president of Welex Inc. was elected chairman.

Hollis B. Cranmer joined the Metals Div. of **Olin Mathieson Chemical Corp.**, New York, as manager of aluminum distributor sales. He was vice president and general manager of Eastern Metal Mill Products Co. Inc.

Edward H. Miller was appointed manager-turbine advance engineering for **General Electric Co.'s** Large Steam Turbine-Generator Dept., Schenectady, N. Y.

Richard H. Griebel was made staff assistant to the manager-manufacturing for **Raytheon Mfg. Co.'s** Government Equipment Div. He will be responsible for administration of the firm's new plant at North Dighton, Mass. He was director of manufacturing for Farnsworth Electronics Co.

Richard T. Thornton was made plant manager for **Ford Motor Co.'s** Indianapolis Steering Gear & Cold Heading Plant, Automatic Transmission & Chassis Div. Formerly manufacturing manager for the former General Products Div. in Dearborn, Mich., he succeeds **Carl F. Franz.**

Hubert Fruehauf was appointed manager of a new Magnesium Products Dept. of **Dow Chemical Co.**, Midland, Mich. **Dr. J. D. Hanawalt**, vice president, manager of the former Magnesium Dept. which the new unit replaces, will devote his major effort to research and magnesium development.

Addison Maupin was made sales manager of the **Chas. Taylor Sons Co.**, subsidiary of National Lead Co., Cincinnati, Ohio.

Marvin R. Minnick was appointed special products sales representative on the West Coast by **Dresser Mfg. Div.**, a member of Dresser Industries Inc. with headquarters in Pasadena, Calif. He was vice president-sales at American Welding & Mfg. Co.

Norman A. Fletcher was appointed manager of manufacturing for the Valve Div., Ft. Washington, Pa., **Minneapolis - Honeywell Regulator Co.**

Paul A. Stewart succeeds **L. C. McAnly** who retires Aug. 29 as manager of manufacturing for **Maytag Co.**, Newton, Iowa.

Harold A. Jones was appointed vice president and eastern manager for **Motorola Communications & Electronics Inc.**, Chicago, subsidiary of Motorola Inc. He replaces **Lowell E. White** who will be working on special assignments. **Robert N. Swift** was elected vice president and midwestern area manager, succeeding Mr. Jones as midwestern manager.

Robert Erickson was named executive vice president of **Beckman Instruments Inc.**, Fullerton, Calif. He was president and director of Heath Co. of Benton Harbor, Mich., a subsidiary of Daystrom Inc.

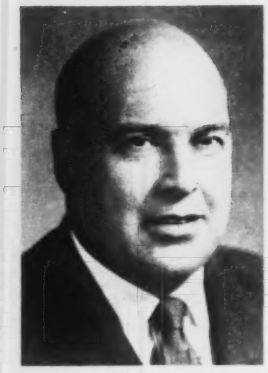
Norman L. McLeod was named works manager of the Port Ewen, N. Y., plant, Explosives Dept., **Hercules Powder Co.** Succeeding him as works manager of the Bacchus, Utah, plant is **John E. Greer. Herbert K. Hedrick**, was named manager of the Pluto Works at Ishpeming, Mich., succeeding Mr. Greer. Mr. Hedrick was assistant manager of the Kenvil, N. J., plant.

De Soto Div., Detroit, Chrysler Corp., named **George O. Gale**, manager-engineering; **J. R. Coughlin**, manager product planning analysis; and **W. A. Reinert**, manager-volume planning.

National Annealing Box Co., Washington, Pa., appointed **William Brooks** to manager of its quality control department. He was chief inspector for Union Carbide Chemicals Co., a division of Union Carbide Corp.

McConway & Torley Corp., Pittsburgh, elected **August A. Rossetti** vice president-operations and **Maurice E. Costello**, assistant vice president-sales.

Homer M. Sarasohn was made director of engineering planning on the corporate staff of **International Business Machines Corp.**, New York. **Theodore J. Weppner** was named director of research and en-



PHILIP W. RUPPERT
National Lead div. mgr.

FREDERICK R. GRUNER
Purolator eng. dir.

HARVEY D. CHICOINE
Westinghouse plant manager

LARRY S. WINSTON
Gilmore Industries v.p.-sales

gineering administrative services on the corporate staff.

Philip W. Ruppert was appointed manager, metal division, for the Atlantic Branch, New York, **National Lead Co.**, succeeding **George Sathre.** He continues as assistant manager of the company's metal department. **Russell C. Kleinecke** becomes manager, metal division, National Lead Co. of Massachusetts, replacing **George A. Savage,** retired.

Gerald D. Doeden was appointed manager of marketing at **Doeden Tool Corp.,** Sherwood, Ohio. He was a sales engineer with General Electric Co.

J. W. Miller was named an assistant vice president in the Birmingham sales office of **Pullman-Standard Car Mfg. Co.**

Henry DeRosa was made sales manager of the Commercial Products Div., **Servo Corp. of America,** New Hyde Park, N. Y. He was general sales manager of the Infra-Electronics Div. of Thos. A. Edison Co.

Thew Shovel Co., Lorain, Ohio, appointed **R. J. Bushong** to the new post of director of product. **O. von Mehren** was promoted from chief design engineer to manager of the product engineering department.

Frank V. Kupchak was promoted to manager of the standards department of **Westinghouse Electric Corp.'s** materials engineering department, East Pittsburgh, Pa. Formerly an engineer in the standards department, he succeeds **Ray Frye,** retired.

Frederick R. Gruner, former chief engineer, was appointed director of engineering of **Purolator Products Inc.,** Rahway, N. J. **Howard M. Gammon** was made chief engineer at the company's central plant in Rahway.

Harvey D. Chicoine was made plant manager for the Cleveland Works and **C. A. Fike** assistant to the division manager of **Westinghouse Electric Corp.'s** lighting division.

Arthur W. Schriewer of Springfield, N. J., was named eastern regional stainless steel specialist for **Chase Brass & Copper Co.,** a subsidiary of Kennecott Copper Corp. He was product manager-stainless steel for Edgcomb Steel & Aluminum Corp. His headquarters are in Maspeth, N. Y.

Vard Inc., Pasadena, Calif., named **Walt Schindler** vice president-engineering. He has served as research and development director, technical director, and director of engineering.

Larry S. Winston was named vice president-sales of **Gilmore Industries Inc.,** Cleveland. He was sales engineering manager of the Test Equipment Div., Greer Hydraulics Inc.

Clarence A. Price was named president of **Uniloy Inc.,** Saline, Mich., subsidiary of Hoover Ball & Bearing Co. He was vice president of Uniloy Corp. and general manager of its unit products division.

Joseph J. Holtzscher was promoted to superintendent of the tin house at Granite City Steel Co., Granite City, Ill. He was acting superintendent. **Melvin O. McKay** was promoted from plant auditor to assistant to the secretary and treasurer.

Lester W. Buechler, former chief engineer at the Electric Products Div., St. Louis, **Vickers Inc.,** was appointed the division's new general sales manager. **Joseph L. Behr** was made chief engineer.

Richard C. Decker was appointed

WALT SCHINDLER
Vard v.p.-eng.

LESTER W. BUECHLER

JOSEPH L. BEHR

appointments at Vickers Inc.

FINE PATTERN on 11" diameter "plunger" forms molding surface for press to make abrasive wheels. The Carborundum Company.

Airkool-S retains precise size and shape through heat treatment

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Milton Roy v.p.-mfg.

G. F. DeCOURSIN
Four Wheel Drive v.p.-mkt.

C. S. SHEPHERD
American Bridge appointment

ROLLAND O. BAUM
Tennessee Products president

DONALD J. MacFADGEN
Koehler Aircraft v.p.-eng.

ROBERT J. NIEHAUS
Hercules Motors general p.a.

product manager-stainless steel at **Caine Steel Co.**, Chicago, Ill.

Tennessee Products & Chemical Corp., Nashville, Tenn., elected **Rolland O. Baum** president, succeeding **Carl McFarlin Sr.**, who was named chairman, a new post. Mr. Baum was executive vice president and general manager.

G. T. Bergstrom was made manager of **American Can Co.**'s Seattle container plant.

Lear Inc., Santa Monica, Calif., elected **Roy J. Benecchi** senior vice president and **James L. Anast, James P. Brown, K. Robert Hahn**, and **Joseph M. Walsh** vice presidents.

Paul Hinds was made assistant manager of the Tractor Equipment Div., **Hyster Co.**, with headquarters in Peoria, Ill. **Dean Polson** was appointed manager of the Martin Trailer Div. plant at Kewanee, Ill. **Rex McCormick** was named assistant sales manager of the Tractor Equipment Div.

Donald J. MacFadgen was promoted to vice president-engineering of **Koehler Aircraft Products Co.**, Dayton, Ohio, subsidiary of New Britain Machine Co. Succeeding him as chief engineer is **Harold A. Herkenhine**, former assistant chief engineer. **George Foster** was named vice president-west coast operations.

Robert J. Niehaus was appointed general purchasing agent of **Hercules Motors Corp.**, Canton, Ohio. He was with the purchasing department, Ford Div., Ford Motor Co.

Karl H. Epple was made director of engineering and **Edward W. McLaren** director of manufacturing for the **Heli-Coil Corp.**, Danbury, Conn., a division of Topp Industries.

Reliance Electric & Engineering Co., Cleveland, appointed as sales engineers: **James H. Chambers**, Atlanta; **Richard A. Christman**, Cincinnati; **Melvin H. Hare**, Greenville, S. C.; **Merle M. Morrow**, St. Louis; and **Millard H. Phelps**, San Francisco.

Paul Gibian was elected vice president-manufacturing of **Milton Roy Co.**, Philadelphia. He will be responsible for purchasing, product engineering, and manufacturing in the Wyndmoor, Pa., plant. He was manager of manufacturing.

Four Wheel Drive Auto Co., Clintonville, Wis., appointed **G. F. DeCoursin**, former vice president-sales, as vice president-marketing. He will be in charge of product origination and development as well as the company's sales program.

C. S. Shepherd was appointed assistant director of purchases in Pittsburgh of the **American Bridge Div.**, U. S. Steel Corp. Succeeding him as chief engineer-facilities and specialties at its Ambridge, Pa., plant is **O. H. Ormsby. G. P. Willard** replaces Mr. Ormsby as assistant district engineer in Pittsburgh.

Harold P. Field was appointed director of marketing for the electronics operation of **Stromberg-Carlson Div.**, General Dynamics Corp. He continues as general manager of Stromberg-Carlson's San Diego, Calif., facilities.

Tube Reducing Corp., Wallington, N. J., named **Frederick P. Huston** chief methods engineer and **Scott N. Randall** chief product engineer.

OBITUARIES...

Alfred R. Schattschneider, 60, owner and president, **King Machine Co.**, Milwaukee, died Aug. 12.

David H. Crouse, 63, plant manager, **Fairfield Mfg. Co.**, Lafayette, Ind., died Aug. 11.

Allison C. Neff, 56, vice president-general manager, **Armco Drainage & Metal Products Inc.**, Middletown, Ohio, died Aug. 11.

William H. Ziegler, 77, chairman, **William H. Ziegler Co. Inc.**, Minneapolis, died Aug. 5.

Charles A. Eisenhardt Sr., treasurer, **Hess & Eisenhardt Co.**, Cincinnati, died Aug. 5.

Carl P. Nellis, 69, former factory manager of the **Inland Mfg. Div.**, General Motors Corp., Dayton, Ohio, died Aug. 2.

AMBALLOY...A. M. BYERS ELECTRIC FURNACE QUALITY STEEL PRODUCTS

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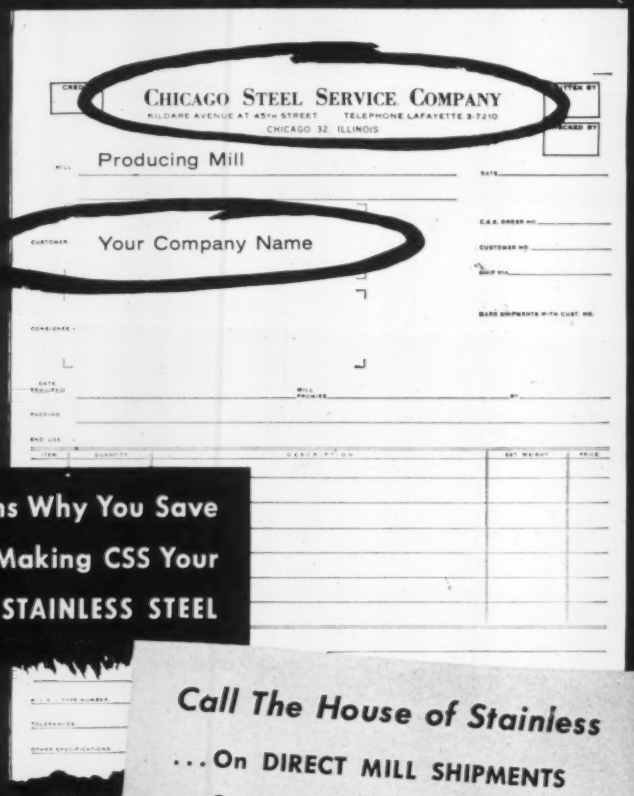
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Sunbeam Buys Plant

Westinghouse discontinues heat treating equipment line and sells facilities at Meadville, Pa.

WESTINGHOUSE Electric Corp., Pittsburgh, has sold its Industrial Furnace Div., Meadville, Pa., to Sunbeam Corp., Chicago, for an undisclosed amount.

The sale included the 120,000 sq ft plant, design and engineering files, equipment, and production facilities.

Sunbeam Stewart Furnace Div., Sunbeam Corp., has changed its name to Sunbeam Equipment Corp. and has become a subsidiary to the parent. It will operate the plant. The new company will be headed by H. C. Gwinn, vice president and treasurer of Sunbeam Corp.

Mr. Gwinn said that the facility will begin manufacturing Sunbeam's line of heat treating furnaces and equipment at the Meadville location as quickly as possible but that no date had been set.

Westinghouse closed down its operations at Meadville on Mar. 7, discontinuing its heat treating equipment line.

Sahlin Co. Adds Space

Sahlin Engineering Co., Birmingham, Mich., maker of press unloading equipment, has increased its plant area by 5000 sq ft. The new space will be used for new product and automation machinery development. Sahlin now has 16,700 sq ft at Birmingham.

Olin in Foreign Lineup

Olin Mathieson Chemical Corp. has formed an international company with four foreign firms to develop French West African bauxite. The new company will build an alumina plant (capacity: 480,000 tons a year) in French Guinea costing $135 million. Olin Mathieson will import about half of the output when production begins in 1960.

The company will be known as FRIA pour la Production de l'Alumine. Pechiney & Co. and Ugine & Co., both French; Aluminum Industrie Aktiengesellschaft, Zurich, Switzerland; and British Aluminium Co. Ltd. are the foreign firms involved.

Addition Completed

Flood City Brass & Electric Co., Johnstown, Pa., has added 10,000 sq ft of manufacturing space and 2000 sq ft of office space to its Johnstown plant.

New Distributor Named

Gisholt Machine Co., Madison, Wis., has acquired U. S. distribution rights to the Cri-dan line of high speed, semiautomatic, single-point threading machines made by Sentinel (Shrewsbury Ltd.) Shrewsbury, England.

Micro-Precision Sold

Micro-Precision Div., Micromatic Hone Corp., Evanston, Ill., has been sold to Hoffman Electronics Corp. Micromatic's president is K. W. Conor.

Dominion Expands Mills

Dominion Foundry & Steel Ltd., Hamilton, Ont., will expand its hot and cold rolling mill facilities, F. A. Sherman, chairman says. The four-high hot mill will be widened to produce 60-in. strip, and a heavy duty, wide capacity down coiler will be installed.

The 42-in. cold mill's speed will be increased and an automatic gaging device added.

Rheem Sells Calif. Plant

Kawneer Co., Niles, Mich., has purchased a Rheem Mfg. Co. plant in San Pablo, Calif. Rheem is keeping 25 acres at the site for potential expansion. Kawneer, a producer of architectural metals, will move equipment from Berkeley, Calif., to the new plant by Jan. 1.

Bethlehem Expanding Mill

Heavy foundation work is underway at Bethlehem Pacific Coast Steel Corp.'s plant at Seattle in preparation for a 12-in. mill being constructed in the East. The new mill will produce 40 per cent more concrete reinforcing bars, bar-sized sections, and light structural shapes than the present merchant mill. Installation of equipment is scheduled for mid-October.

Construction of the blooming mill and soaking pits is on schedule. Both are planned for production in October.

Conax Builds Addition

Conax Corp., Buffalo, N. Y., is building a $100,000 addition to its 15-month-old plant, doubling its manufacturing space. Conax makes high-pressure thermocouple assemblies and explosive-actuated valves.

New Forges To Be Added

Metals Processing Div., Curtiss-Wright Corp., plans to spend over $1 million for six to eight new forges and related equipment. New rotary forging equipment costing $250,000 has already been installed in the Buffalo plant.

Forms Strip Steel Div.

Peterson Steels Inc., Union, N. J., established a Strip Steel Div. with headquarters at Melrose Park, Ill. The unit will promote the sale of razor blade steels, tempered spring steels, and other high carbon steels. It'll market steels rolled at the Hellefors Works, Sweden, and the Eberle Works, Augsburg, Germany.

New Space Ups Total 50%

American Air Filter Co. Inc., Louisville, will build a $750,000 addition to its Herman Nelson Div., Moline, Ill. The 76,800 sq ft plant, adding 50 per cent to the division's facilities, will be finished in early 1959.

Hubbard & Co. Expanding

Hubbard & Co. is expanding its Oakland, Calif., and Chicago plants. Improvements include larger production facilities, new machinery, and the modernization of machine, assembly, and material handling operations.

Hubbard's expansion program also includes the Hubbard Electrical Research Laboratory which was dedicated recently in McCook, Ill., moving its executive offices from Pittsburgh to Chicago's Borg-Warner Bldg., this month, and improving the company's warehouse

and shipping facilities at Plano, Tex.

Embassy Steel Forms Div.

Embassy Steel Products Inc., Brooklyn, N. Y., organized an Industrial & Special Applications Div. to make component products. The firm's established lines include convectors, fin tubes, boilers, and air-conditioning equipment.

Firm Has New Name

Fulton Steelcraft Co., Toledo, Ohio, has been renamed Higgins Metal Products Co., James F. Higgins, vice president, reports.

Hoover Plans New Plant

Hoover Co. will build a $2-million factory at Canton, Ohio. The new facilities are needed to provide for increased sales and product expansion, says H. W. Hoover Jr., president.

Bock Leases Lynch Plant

Bock Laundry Machine Co., Toledo, Ohio, has leased the former Lynch Corp. plant, that city. The 50,000 sq ft building will provide additional manufacturing space for Bock's expanding production.

RCA Gets N. J. Plant

Radio Corp. of America has acquired the production plant of Applied Science Corp., Princeton, N. J. Astro-Electronic Products Div., RCA, will use the plant as a long term engineering and production facility.

R&D Department Begun

E. F. Hauserman Co., Cleveland, has established a research and development department. Heading the department is Hugh F. Beckwith, formerly Hauserman's market development manager.

Buys Rolling Mills

Yuba Consolidated Industries Inc., San Francisco, has purchased Western Rolling Mills Inc., San Jose, Calif. Western's two 6 in., two high, four stand, bar mills will be enlarged, modernized, and moved to a site near Tempe, Ariz. The plant is expected to be in full operation before the end of this year, says John L. McGara, president and chairman of Yuba.

Yuba will add a $250,000 wing to its Buffalo, N. Y., Adsco Div. The addition will be used for fabricating operations.

Plans Los Angeles Mill

Soule Steel Co., San Francisco, manufacturer of steel building products, will build a steel rolling mill in the Dominguez industrial area of southwest Los Angeles. Cost: "Several millions of dollars."

The mill, expected to be in full operation by the fall of next year, will have a rated capacity of 36,000 tons of billet sized ingots a year, says Edward Lee Soule Jr., president. The plant will produce a variety of bar shapes.

Since 1930, the company has operated a plant in Los Angeles for the production of steel building materials. Other plants are in San Francisco, Torrance, Calif.; Portland, Oreg.; Seattle; and Phoenix, Ariz.

NEW PLANTS

Stanley Works, New Britain, Conn., opened its western corporate office and warehouse at 7141 S. Paramount Blvd., Pico-Rivera, Los Angeles. Harvey A. Clark is manager. The 20,000 sq ft building houses the regional sales and warehouse operations of the Stanley-Judd Drapery Hardware Div. for 11 western states, Stanley Steel Strapping Div. for Southern California, Stanley Electric Tools Div. (including a repair service center).

Western Wire & Cable Co., Edmonton, Alta., officially opened its $500,000 plant at Lancaster, N. B. The 14,000 sq ft facility will produce industrial and commercial electrical wires.

Alloy Engineering Co., Berea, Ohio, moved into its 20,000 sq ft plant, tripling its facilities. The firm specializes in the fabrication of ferrous and nonferrous, corrosion resistant alloy furnace parts.

Butler Mfg. Co., Galesburg, Ill., plans to build a plant on property adjoining its present facility. Cost, including equipment: $7 million. The firm makes grain bins and other metal structures.

NEW ADDRESSES

McJunkin Corp., Charleston, W. Va., moved its Gateway Center sales office (Pittsburgh) to the expanded warehouse office facilities of the company's subsidiary Chandler Boyd Co., Leetsdale, Pa. Large stocks of industrial and oil and gas well supplies are maintained.

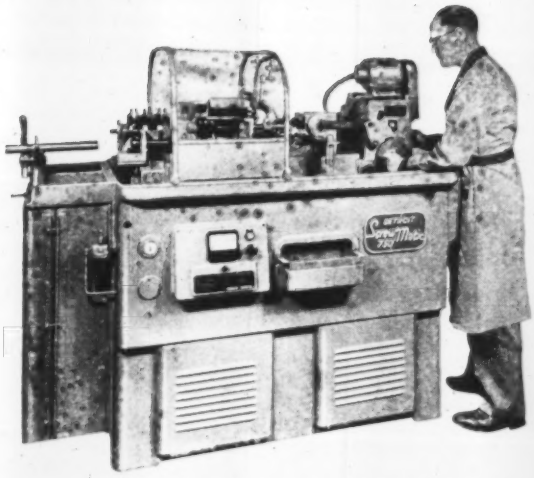
ASSOCIATIONS

National Association of Waste Material Dealers Inc., New York, reorganized its executive staff. M. J. Mighdoll has been elected administrator and secretary. Clinton M. White, formerly executive vice president and secretary, was named consultant to the board. Harold C. Rowe, staff executive, will serve as secretary of these divisions: Cotton Rag Council, Foreign Trade Div., Scrap Rubber & Plastics Institute, Textile Fibres Institute, and Waste Paper Institute. A new member of the staff (secretary to the Metal Dealers Div. and Secondary Metal Institute) will soon be announced.

CONSOLIDATIONS

Shepard Warner Elevator Co., Cincinnati, is merging with **Dover Corp.,** Washington, and will be operated as a division under the name of Shepard Elevator Co. Another Dover division, Rotary Lift Co., Memphis, Tenn., is also a builder of elevators. Stanley M. Rowe Jr. will continue as president of Shepard Elevator. Other officers are: Chairman, Stanley M. Rowe; vice president and treasurer, E. A. Hoffmann; assistant vice president, Bruce Ford-Coates; secretary, Snowden Rowe; and assistant treasurer and assistant secretary, R. J. Moser.

Schlage Lock Co., San Francisco, acquired **California Lock Co.,** Downey, Calif., producer of residential lock sets.



THE DETROIT SCREWMATIC 750 MANUFACTURED BY THE GEAR GRINDING MACHINE COMPANY INCLUDES CUTLER-HAMMER THREE-STAR MOTOR CONTROL AS ORIGINAL FACTORY EQUIPMENT.

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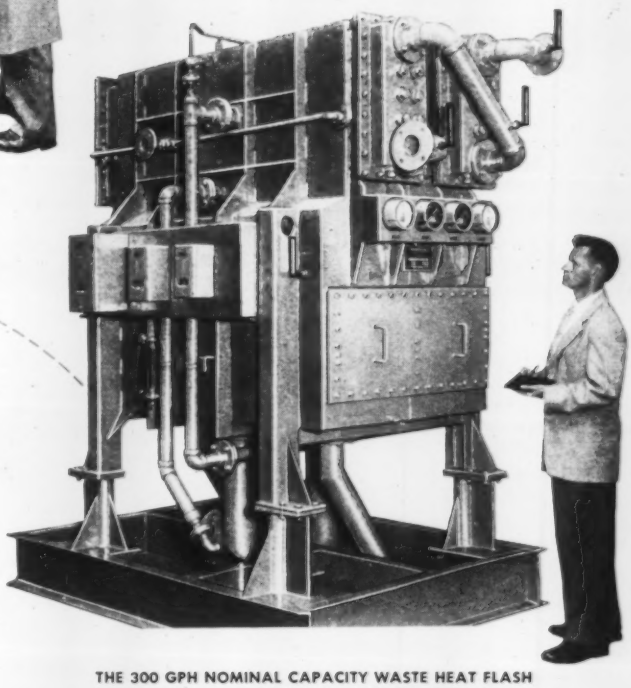
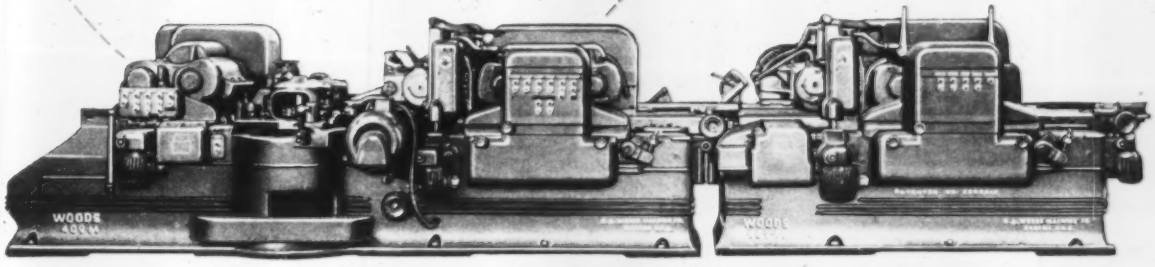


THE 300 GPH NOMINAL CAPACITY WASTE HEAT FLASH EVAPORATOR BUILT BY CLEAVER BROOKS COMPANY IS EQUIPPED WITH CUTLER-HAMMER THREE-STAR MOTOR CONTROL AS ORIGINAL CONTROL EQUIPMENT.



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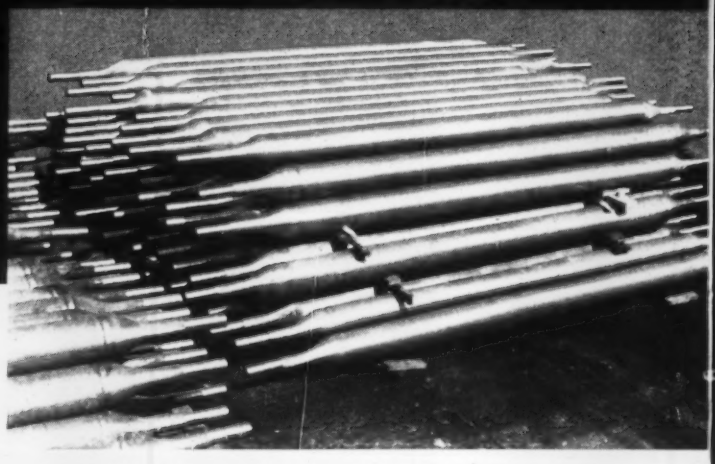

AT THE HOMESTEAD WORKS OF U. S. STEEL National Alloy Rollers carry USS "T-1" plate up to 45 feet long, 13 feet wide, and 2 inches thick through heat treating furnace.

AT LUKENS STEEL National Alloy Rollers have been in service more than 2½ years where plate up to 172 inches wide and 3 inches thick is heat treated.

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Establishing better properties in steel plate through heat treating has become a continuous, high output operation at leading steel producers. As the leading specialist in high temperature, high alloy castings, National Alloy, cooperating with Drever, engineered, centrifugally cast and produced some of the largest high alloy rollers now in use to handle plate up to 3 inches thick and 172 inches wide. These rollers vary in diameter from 8 to 14 inches and are 20 feet long.

Meeting the ever-increasing demands of industry for high temperature, high volume equipment has given National Alloy unmatched experience in the development and manufacture of high alloy castings for maximum service. Consult National Alloy for a practical answer to your high temperature and high corrosion problems.

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Technical Outlook

RADIOACTIVE INSPECTION—Hidden parts in mechanical assemblies can be inspected at a rate of 3000 an hour by a new device, called Atomonitor. The U. S. Army Ordnance Corps is using the first model to check artillery shell fuse heads for complete firing pin assemblies. Parts to be detected are plated with 1/100th microcurie of radioactive silver. A Geiger counter checks for radiation; nonradioactive assemblies are ejected from the line.

FOIL BARRIER— A new corrugated plastic panel is made of two layers of resin-impregnated Fiberglas with a sheet of perforated aluminum foil sandwiched in between. The foil reflects most of the sun's rays, while the perforations let a bit of light through.

TURBINE FOR BOATS—Solar Aircraft Co., San Diego, Calif., is developing a high efficiency, 1000 hp gas turbine engine for marine propulsion. Known as the Saturn, the engine will be lighter and smaller than the 500-hp gas turbines, and will be a fraction of the size and weight of marine diesels, says Solar.

BRIGHT COPPER— Shorter plating times and elimination of excessive buildup are predicted for the Ro-Bright process of producing semibright or bright copper deposits. Current densities range up to 80 amperes per square foot (using direct, interrupted, or periodic reverse current). The cyanide plating process was developed by R. O. Hull & Co. Inc., Rocky River, Ohio.

PROCESS TO WATCH— Applications of the fluidized bed process are increasing rapidly, says Battelle Memorial Institute, Columbus, Ohio. (It's an improved way to refine or change solids, like metals and ores, with certain gases.) The process is being used to calcinate limestone, treat sludge deposits from water softening systems, roast sulfide ores more efficiently, reduce metallic oxides easily, and chlorinate titanium. Probable applications include: Chlorination of magnesium, chromium, silicon, columbium, and zirconium oxides; nitrate decomposition of manganese or uranium; recovering the sulfides of cadmium, zinc, and germanium from zinc processing.

LIGHTER CASTINGS— Tens-50 is a new aluminum alloy that will reduce the weight of cast parts 25 to 40 per cent, says Navon Products Inc., Los Angeles. It is tailored for the average foundry design minimums: Permanent mold, 45,000 psi; sand casting, 42,000 psi.

ANALYZER FOR HOT GAS— The safety of solvent drying ovens will be improved by a gas analyzer that will operate at 350° F. Plastic insulators (whose operating limit is 140° F) have been replaced by ceramic parts. A warning signal is incorporated in the circuitry to operate if filaments burn out or the sample flow is abnormal. They are made by Mine Safety Appliances Co., Pittsburgh.

NEW MISSILE ALLOY—A Dow magnesium alloy which contains 0.6 to 0.7 per cent zirconium has high damping characteristics. Developed for missiles, Bell Telephone Laboratories, New York, predicts wide application where weight limitations prohibit the use of shock mounts.

SWITCH HITTER— When the textile machinery business went sour, Warner & Swasey Co., Cleveland, looked around for another market for its weaving machines. A machine designed originally for weaving woolens is now doing fine in the metalworking field—weaving wire screening.

PEOPLE CONVEYORS— Endless conveyor belts transport people in the Johnstown Coal & Coke Co. mine at Panther Gulch, W. Va. The installation, appropriately called a Manveyor, was made by Hewitt-Robins Inc., Stamford, Conn. It carries miners 450 ft down a 20-degree slope at 150 fpm.

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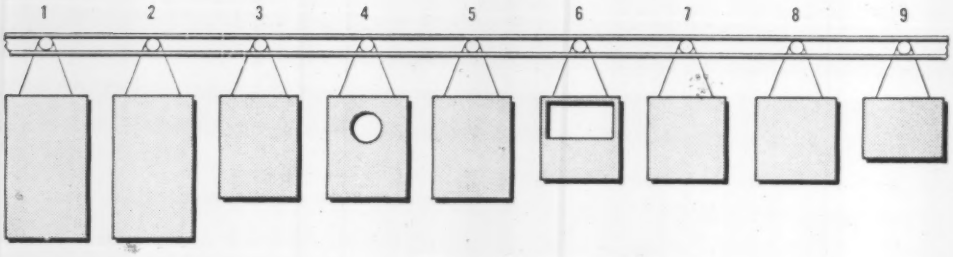


OLD METHOD: Hanging and painting *nine separate pieces* per cabinet required 32 ft of conveyor line.

How We Beat the Cost Crisis

Preassembly Cuts Painting and Handling Cost

New method of processing furnace cabinets saves enough to pay for the additional equipment in less than a year. Aggressive management took the step to reduce production costs by weeding out inefficiency. The article is one of the top entries in the Cost Crisis Competition. Another will be published next week

PAINTING took too much time and handling required too much manpower in the production of parts for furnace cabinets at the Janitrol Heating & Air Conditioning Div., Surface Combustion Corp., Columbus, Ohio.

Nine metal panel-shapes had to be formed, then processed separately through painting, baking, and storage—all prior to assembly.

Doyle D. Tilton, chief plant layout engineer, says management reasoned that if the cabinets could be assembled before they went through this stage of processing, a great deal of handling time (and conveyor space) could be saved. Also, if the conveyor could be tied in with the assembly line, time and money wasted in putting parts in and taking them out of storage would be saved.

The Conversion — Janitrol redesigned the furnace cabinet. It

bought about 50 ft of conveyor lines, and did a new layout of the whole conveyor system, so cabinets would be delivered to assembly rather than to storage. New hangers were purchased to accommodate the cabinets.

New System—Assembled cabinets wait on a roller conveyor. The operator puts the hanger in place and connects it to the traveling overhead conveyor. He doesn't have to lift the cabinet—the overhead conveyor drops low enough to pick it off the rollers.

After the part has progressed through painting and baking, the conveyor hauls it to the assembly line where the conveyor places the part on rollers.

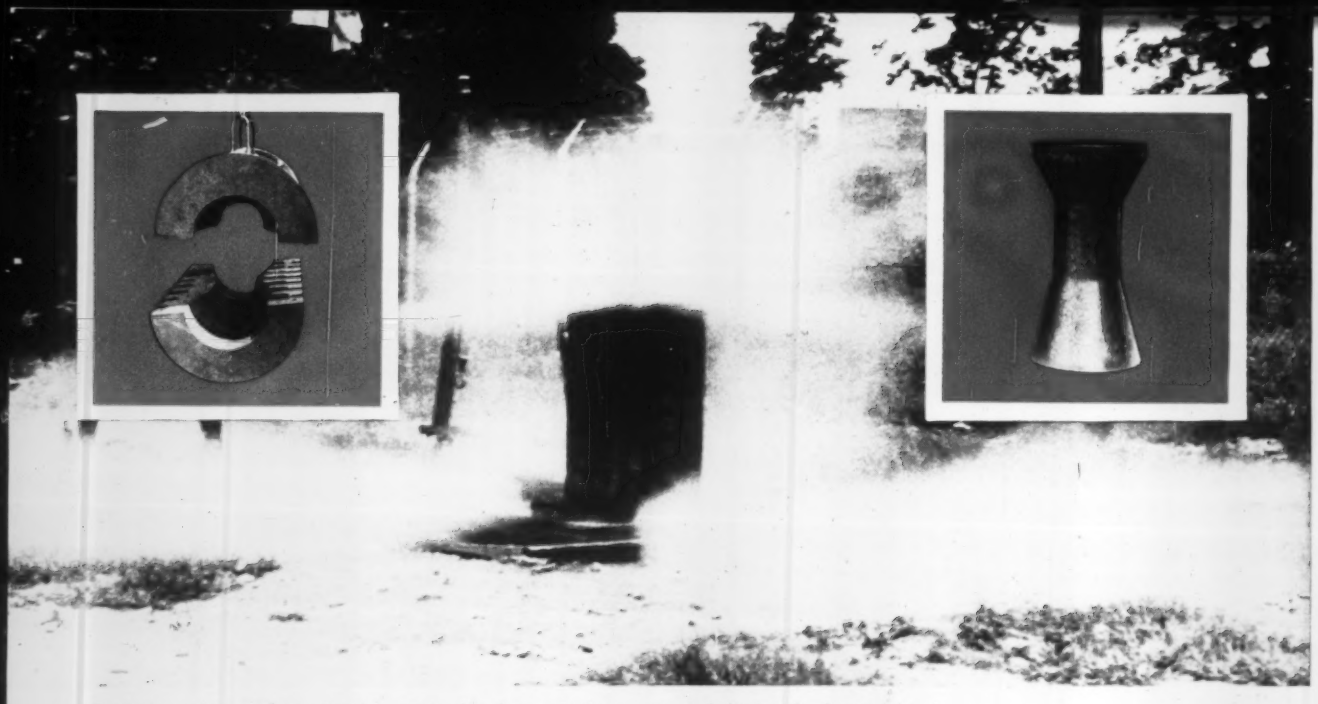
Savings—One cabinet takes 14 ft of conveyor space for painting—the nine components took 32 ft. To allow proper time for the painter, the line speed was reduced from 16 to 13 ft a minute.

Even with the slower line travel, it takes nearly a minute less to paint the cabinet than it did the nine parts.

Time savings, coupled with the elimination of a lot of handling, are bringing annual savings of $7200 a year—that's about 30 cents a cabinet.

In addition, time reductions have meant added capacity on the line. Tying the painting process to the assembly job permitted closer scheduling.

Now Underway—Welding equipment is being installed to joint cabinet subassemblies—it will replace screw fastening, cutting cabinet costs even more.



Explosives can safely stretch metals far beyond their expected limit of elongation. Navy rocket nozzle (right) made of 1020 steel, stretches 70 per cent (normal: 42 per cent). National Northern Corp. does it in two steps with cast die (left)

attacking the PRODUCIBILITY BARRIER

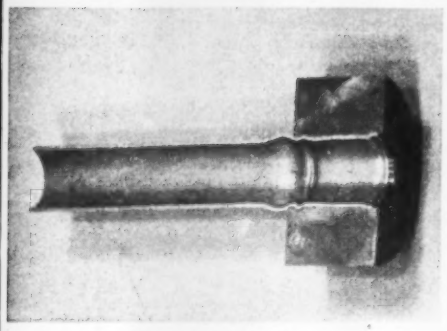
Explosives Form Space Age Shapes

"Besieged with inquiries," says one authority . . . several firms already in production . . . job shops getting set on West Coast. Method makes child's play of getting tough metals into tough shapes. One lab even compacts titanium filings. Prediction: It may never replace standard methods, but it can't be beaten for short runs or the unusual jobs that can't be handled any other way

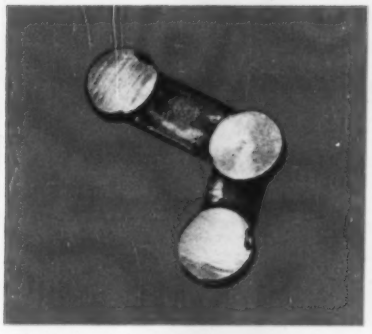
INDUSTRY is harnessing the awesome energy of explosives to handle some of today's toughest forming jobs. It's a technique that promises to break many space age producibility barriers.

Cartridges or detonating compounds (often in combination with simple tooling) are being used to:

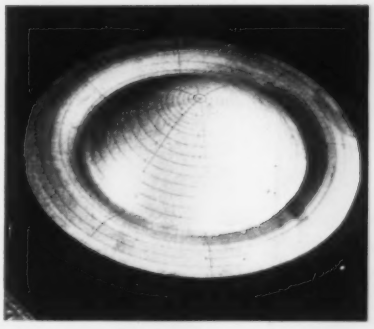
- Forge (pump rotors, actuating arm).
- Extrude (wires, simple shapes).
- Coldweld (dissimilar metals, cladding, pipe and tube linings, tubes in header sheets).
- Pierce holes without tools.
- Cut outsize billets with no kerf loss.



Tubing cold welded to header sheet



Cold forged rocker lever

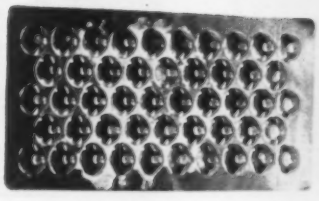


Draw sample shows even metal flow

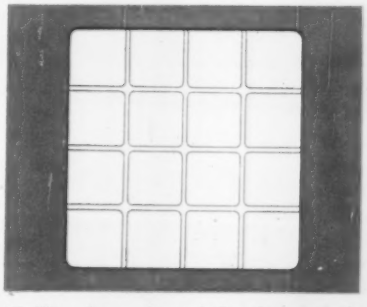
• Work harden copper and Armco iron nearly 100 per cent with no dimensional or grain changes.
• Emboss stainless sheets on a plastic pattern that never wears out.
• Flatten wrinkled sheets.
• Separate a thin sheet into two thinner ones.
• Elongate carbon steel 70 per cent (normal limit: 42 per cent).

Example: The sound suppressor and thrust reverser (below) for Boeing's newest jetliner, the 707, is made of hard-to-form stainless. Each oddly shaped tube in the device is formed quickly, safely, and almost silently in Rohr Aircraft Corp.'s Chula Vista, Calif., plant. (Winchester-Western Div., Olin Mathieson Chemical Corp., New Haven, Conn., is the subcontractor.) It's cheaper and faster than conventional methods. Parts have no springback. Scrap is less than 2 per cent.

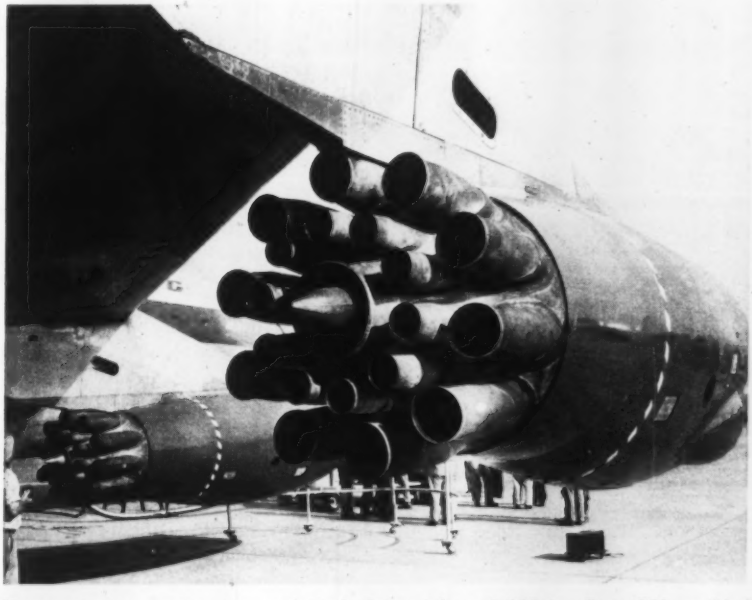
Outlook—The Air Force, anxious to overcome producibility barriers, is a prime mover in developing and encouraging the technique. Col. P. L. Hill, Air Materiel Command, Wright-Patterson Air Force Base, Ohio, says: "Explosives are a breakthrough in the art of forming metals. Instead of massive forming presses, we need only an explosives expert, simple tools, a tank of water,



Stressed skin for honeycomb (17-7 PH stainless)

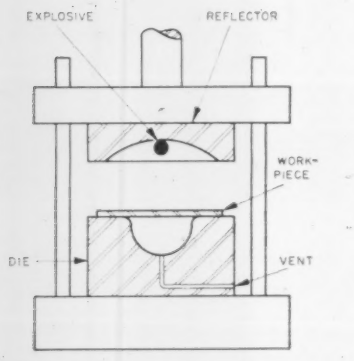


Waffle shape forged for honeycomb

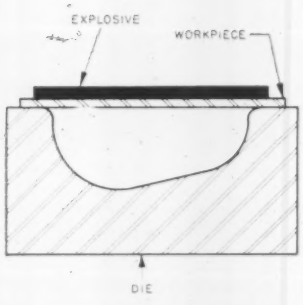


These suppressor tubes are explosively formed from 0.032 in., Type 321, welded stainless cylinders. Welds hold firmly, seem to be unaffected by quick stretch. Cartridge power is comparatively quiet in proper equipment

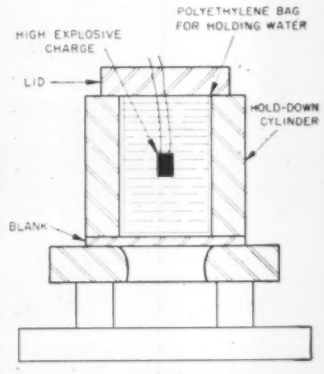
Embossed plate with hard paper die below



Shaped charge and parabolic reflector. Shock and pressure are the motive power. Reflector and charge must be shaped to direct explosive force toward the workpiece



Flat high explosive is simply placed on top of sheet which lies on female die. Forming over a punch doesn't seem to work. Experiments have produced wrinkles



Simple tools with high explosives appeal to some. This setup illustrates one firm's approach. Hold-down cylinder is often a carton of water or a bolted ring on lower die

and some space in an isolated area."

Warnings — Vasil Philipchuk of National Northern Corp., a subsidiary of American Chemical & Potash Corp., West Hanover, Mass., is an authority on the effects of explosives on metals. His observations point up the need for expert guidance: "This new method seems to violate all the rules of forming. When a metal tears during a draw, press people will tell you to use less pressure, slow down the press, or anneal. It's just the opposite with shock waves: Increase the pressure and the trouble usually disappears."

Is It Safe?—One executive said: "We're selling power. Properly applied it's as safe as electricity, gas, or steam." But he hastened to add that it's no job for the amateur.

The experts advise those without experience: 1. Use a trained crew supplied by a manufacturer of explosives or an established job shop. 2. Or make arrangements for the training of your own crew. 3. Or send the work to an established job shop.

How It's Done—Most of the work involves cartridges, powder charges, shaped charges, or high explosives (detonating compounds).

Cartridge power works directly on a metal blank or moves some mechanical device with hydraulic fluid or a piston. High explosives require the least investment in tools and dies. In many cases, water or an oily transfer medium helps to concentrate shock wave effects.

National Northern's experience with tools is typical. The firm finds concrete, plaster, cast iron, and plastics have their place. "Plaster is all right for one shot, concrete for several. In some cases, plastics will last indefinitely," says Mr. Philipchuk.

The method works well on practically all metals. Welds withstand the treatment in many cases, although some report repeated failures. Many top authorities say: "The tougher the metal, the better the results."

Detonating Compounds

Some of the more spectacular results are obtained with high explosives. Opinions vary about pressures: They run from 500,000 to 7½ million psi. Shock waves produced by a large explosion travel around 25,000 ft a second.

Under such loads, even the toughest metals behave strangely. They act more like fluids or plastics than solids.

STEEL saw stainless sheets embossed at the National Northern Corp. The die: Plastic letters taped to a thick steel plate. The punch: 12 grams of high explosive centered in a 1-gallon ice cream carton filled with water.

After placing the carton on the stainless sheet and the die, an operator detonated the charge. The results: Every tiny scratch, pit, pore, and outline of the base plate and plastic letters were faithfully reproduced on both sides of the plate.

Experts say this capacity to pick up details will form threads on pipe.

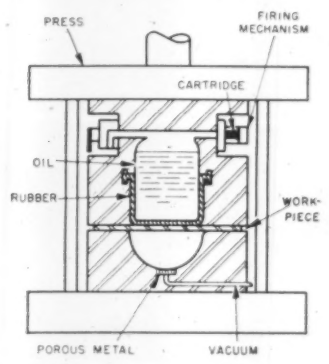
Aids Elongation—The firm also makes rocket nozzles from 1020 steel. Starting with a tube and a cast die, it bulge forms, anneals, and finishes with a final blast. The result: 70 per cent elongation in a metal that has a normal elongation of only 42 per cent.

Another Approach — Convair, a division of General Dynamics Corp., San Diego, Calif., has a development program. Its experience ranges from 0.0015-in. foils to ½-in. plates of 17-7 stainless and aluminum. The firm has patented a method called Dynaforming.

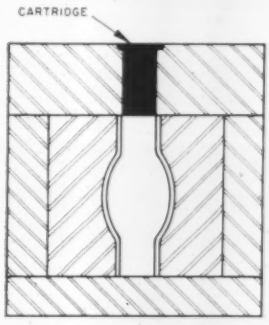
Explosive compositions vary from dynamite to PETN, which has extremely high power. Die materials run from paper and clay to tool steels—some forming has been done without tools. The staff's ideal: "Missiles and aircraft made in two pieces glued down the middle."

Spectacular — Size apparently makes little difference. Convair officials at Ft. Worth, Tex., jokingly say they'd like to use the Gulf of Mexico as a forming die.

The largest example STEEL turned up is a stainless steel cylinder, 3 ft in diameter, 5 ft long, with walls



Gunpowder cartridges are usually applied in a press or enclosed die. This one uses oil and rubber to distribute force. Vacuum prevents air pocket which would retard action



Bulge forming with cartridge power is comparatively simple and safe. Winchester points out such devices properly vented are less noisy than many standard forming operations

3½ in. thick. Using 100 lb of high explosive, National Northern made it into a barrel shape. Use is classified, but the firm expects to be making the cylinders regularly. The conventional approaches seem cumbersome by comparison.

An Old Timer—Moore Co., Kansas City, Mo., is a pioneer in explosive forming. It makes ventilating fans for cooling towers. Fan hubs are of stainless or Monel. They've been formed explosively since 1950.

The Moore die is made of several plates in a kind of laminated assembly. Plates are slightly spaced for venting. Welded cylinders are inserted, the die partly filled with water, and dynamite placed in the center. With a light cap in place, the charge makes the cylinder into barrel shapes instantly.

Moore considered doing the job with hydrostatic forming but found it took end plates 12 in. thick held by twelve 6-in. bolts.

Makes Forgings — The explosive method, says Mr. Philipchuk, takes up forging where Wyman-Gordon's famous 50,000-ton press leaves off. He has forged turbine impellers from alloy steel and cold welded aluminum strips. A single shot reproduces thin webs. It even picks up the tiny vent holes at the bottom of the die.

E. I. du Pont de Nemours & Co. Inc., Wilmington, Del., developed a widely known method of swaging a collar around a cable eye. The cable eye is put through a steel cylinder. Primacord, a ropelike explosive with the consistency of plastic, is wrapped around the cylinder and detonated. When sawed open, you can see that the steel is almost welded to the cable. It has some promise as a simple way to splice cables in the field.

Heat Treatments — Prof. C. S. Smith, Institute for the Study of Metals, University of Chicago, found that copper and iron harden more from explosive shock waves than from a 95 per cent reduction by cold rolling. *But dimensions, density, and grain structure remain unchanged.*

Photomicrographs show that the copper has much mechanical twinning; the iron has a complex microstructure like that of carbon-free martensite.

Metal Separation—Olin Mathieson's Explosive Div. is checking metal fracturing or cutting with explosives for Battelle Memorial Institute, Columbus, Ohio. Officials say the program is too young to draw conclusions, but we have these results: 1. Instantaneous separation of large steel billets into two pieces without kerf loss. (Explosives placed at both ends of the billet are exploded simultaneously. Fracturing takes place where the two shock waves meet.) 2. Separation of one sheet into two. (Layers of sheet explosives on each side of a 0.042-in. sheet are detonated simultaneously. The result: Two sheets 0.020 in. thick, each accurate within 0.002 in.)

Preliminary Work—Much of the early research on fracturing was done by John S. Rinehart, professor of mining engineering and director of the mining research laboratory, Colorado School of Mines, Golden, Colo. His observations: Failures under impulsive loads (like an explosion) differ from those under static loads. An odd result is that pieces fracture at the strongest point. His work shows that fractures always occur perpendicular to stress; they are well defined and reproducible.

Low Velocity Methods

These methods rely on containers. Frequently, they require hammers, rams, or pistons.

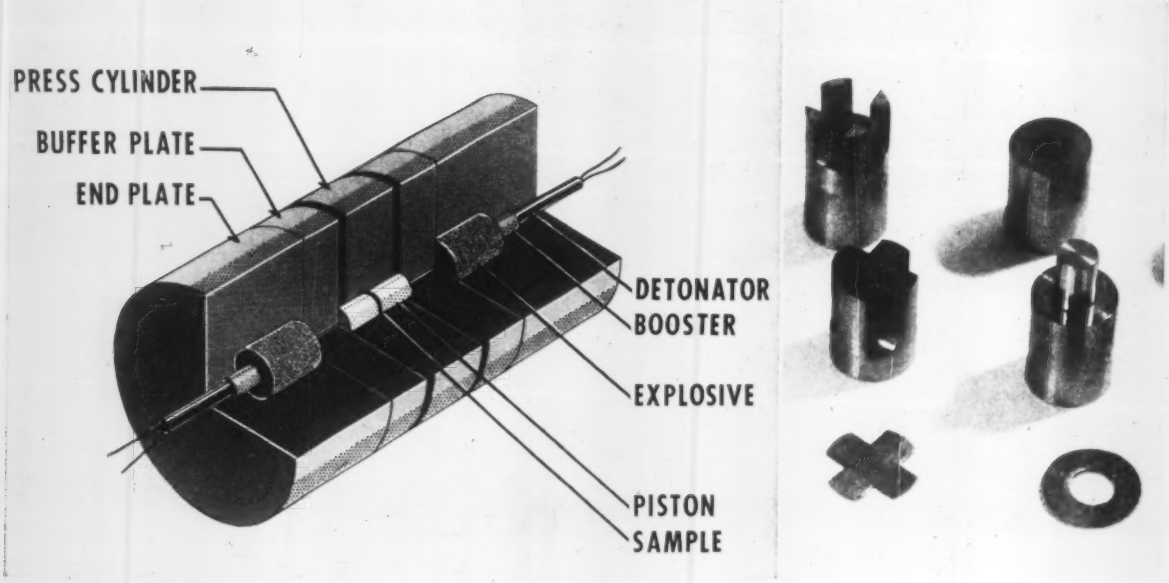
One of the most widely heralded

Metal Hardness after Shock Treatment

Condition	Brass	Copper (OFHC)	Armco Iron
Annealed	69	54	95
After heavy shock (above 400 kilobars)	192	132	284
Cold rolled (95% reduction)		129	259

Note: Hardness numbers are Vickers with a 136-degree diamond pyramid and a 100-gram load.

Source: C. S. Smith, professor of metallurgy, Institute for Study of Metals, University of Chicago.



Work at Naval Ordnance, China Lake, Calif., with this explosives press produced a cross and washer from unprepared titanium filings. Study included ceramics, cobalt, and diamond dust

U. S. Navy

devices is Convair's HyGe (pronounced high gee). It uses highly compressed gases to slam two rams together. Officials say they aren't ready to make results public, but STEEL learned from a reliable source that the machine can cold extrude a 1-in. steel billet into a 0.020-in. wire in one crack.

Confirmation—Capt. Paul Wolf of the Air Materiel Command says billet extrusions are "well-established." One of the problems, he says, is getting the extrusion to stop—once it's through the die it acts like a projectile.

But better control has produced an amazing product: Self-straightening wire. As it extrudes, waves and slight bends are formed. Since it travels at high velocity, there is a lot of inertia. By venting or timing the explosion to stop before extrusion is complete, inertia drags the rest of the billet through the die and straightens the wire at the same time. The method also eliminates the waste "cookie" left in conventional extruding machines.

Making Powders Behave — John Pearson and E. W. LaRocca, U. S. Naval Ordnance Test Station, China Lake, Calif., have compressed powders of cobalt, titanium, diamonds, iron oxide, ceramics, graphite, and sulfur. Using an explosive-actuated press, they found that the terrific pressure permanently changes some of the physical properties of those materials. Expected uses: Commercial pressing of metals too hard to handle by normal methods; coldwelding of dissimilar materials (ceramic-metal combinations).

The China Lake installation has both single and double-acting presses. The double-acting type (called sandwich construction) explodes two charges simultaneously and drives opposed pistons (much like on a small-scale HyGe).

Another Type — Boeing's sound suppressor tubes provide an example of bulge forming. Type 310 stainless sheets are formed into cylinders and welded. After inserting them in a die, the shape is formed when a cartridge is detonated.

Another Idea—Some conservative approaches are simply hydraulic formers actuated by cartridges. Others, like Ramset (a Winchester product) use a free floating piston to pierce or dimple skins for aircraft. A remarkable effect: Pierced holes have no burr, no fine cracks.

Summing Up

STEEL's survey turned up more than a score of firms deeply involved in research or production. Explosive firms probably have the inside track (although some larger corporations already play a major role).

Given some funds, researchers are unanimous in the belief that there's no limit in sight for practical applications. They want to tackle tough, intricate jobs first — wait until they're established to handle the more routine items.

Price Tag — Compared tool for tool, costs are greater than those for standard mechanical presses. But you can realize savings if you can use simplified tools, cut the number of operations, reduce scrap, or make it unnecessary to hire additional press capacity.

What's Ahead?—Two job shops (National Northern Corp. and possibly Winchester-Western Div.) will soon be operating on the West Coast. (There's talk of a third.) A few of the larger firms have set up their own shops.

Convair has its own research program. Lockheed Aircraft Co., Burbank, Calif., has a multimillion dollar program for the Air Force.

• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.

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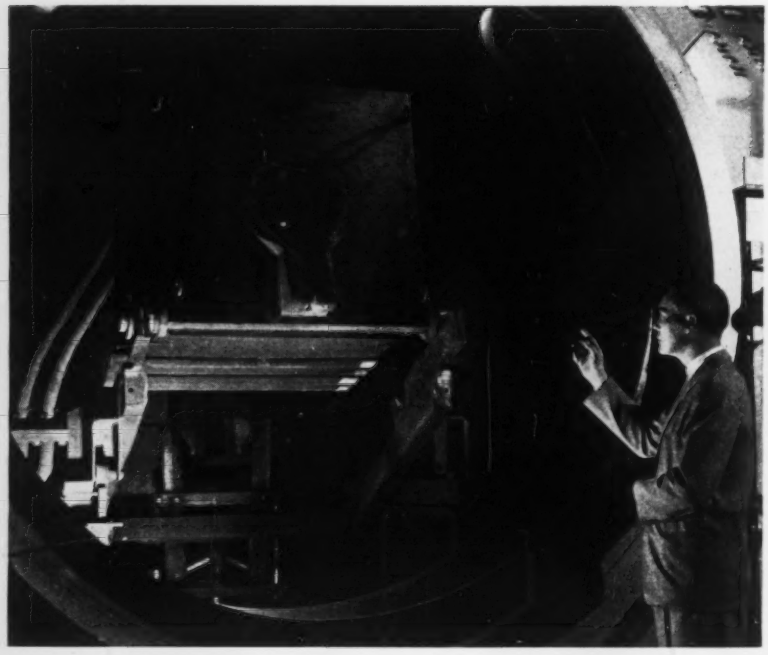


Rise of vacuum melting makes it vital to learn . . .

How To Make Refractories Behave in Vacuum

When they can't be kept from reacting with metals during this process, advantage is taken of selective properties, such as combining with impurities in the melt

VACUUM MELTERS have about decided that the best refractory is no refractory.

However, they've achieved that ideal state only in the laboratory with tricks like levitation melting. The closest they come to it on a production scale is consumable electrode melting, which uses a water-cooled copper mold, or a "skull" of the material being melted, as a refractory container. But "ordinary" induction vacuum melting still demands refractories in the usual sense, and melters still find them a problem.

Reactive Crucibles — At melting temperatures, reactive metals like titanium and zirconium begin to act like a universal solvent. They combine with the melting pot, and the result is contaminated metal.

Fortunately, refractories are selective in their reactions, and some have the ability to combine with impurities in the melt. Melters take advantage of these properties to choose refractories for vacuum induction melting that are either:

1. Inert to the metal being melted under the temperature and pressure conditions imposed, or
2. Inclined to enter into reactions that purify the metal by combining with its impurities.

Vacuum by Choice—The choice of a specialized refractory is important with metals which can be air melted, but are vacuum melted to improve their quality. Refractories suitable for air melting may not work out because of the reduced pressure.

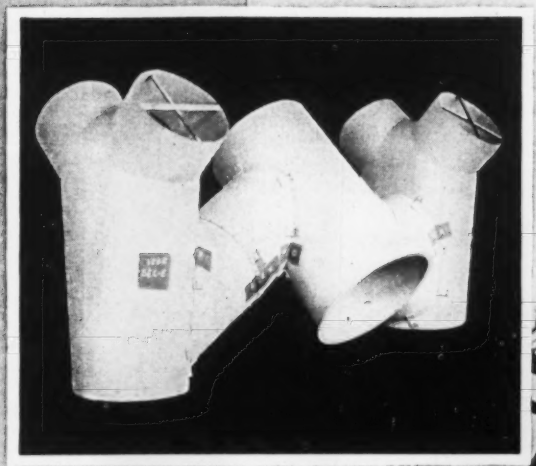
Gas evolution is one problem. It rules out porous materials such as fire bricks which contain large quantities of water vapor, although there are times when the controlled evolution of reactive gases can be useful. Refractories must also retain their strength at high temperatures and be insoluble in the melt.

Carbon—One widely used crucible material is carbon (or graphite). It works well with the less reactive metals such as copper, silver, and gold, which do not dissolve carbon or form carbides. It also may act as a refining agent, combining with oxides in the melt to reduce them to carbon monoxide, which passes off.

Sometimes, the excellent qualities of carbon can be utilized, even when the metal being melted reacts with it. The trick is to coat the crucible with a thin layer of a premium refractory such as beryllia (beryllium oxide), which protects the graphite and capitalizes on its low cost and high strength. Uranium-columbium alloys are vacuum melted in graphite crucibles faced in this fashion.

Magnesia—Metals that form carbides, or melt at temperatures at which unwanted reactions would take place in composite crucibles, are melted in furnaces lined with solid oxides. A common one is magnesium oxide (magnesia).

When mild steel is melted in a magnesia crucible, excess carbon is added to the melt to reduce its oxygen content by forming carbon monoxide. Then the remaining carbon is in turn lowered by reaction with the crucible. The carbon combines with the magnesia to produce carbon monoxide which is swept out in the vacuum, and magnesium which vaporizes and condenses in crystalline form in the



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CHARGING BOX CARS • WELDED OPEN HEARTH LADLES

cooler parts of the furnace.

Zirconia — High chrome alloys produce a comparable reaction in a magnesia crucible, but the chromium oxide formed remains in the melt as an insoluble inclusion instead of passing off as a gas. While it is possible by delicate temperature control to melt high chrome alloys in magnesia, probably a better answer is to use a zirconia crucible. This oxide is stabilized by lime or magnesia additions, and will not react with the melt.

Aluminum—Aluminum has a notorious ability to dissolve containers, especially when heated past its melting point. Processes requiring evaporation of aluminum at about 2375° F meet with a lot of difficulty. At this temperature the metal dissolves graphite and oxide refractories, including aluminum oxide, eating away the crucible and producing inclusions in the melt.

Inclusions are also a problem with carbide and boride crucibles, which the aluminum erodes by eating away the bonding agent, although the individual carbide and boride particles are immune to direct attack. One ingenious solution has been to add titanium or zirconium to the aluminum which is to be evaporated. The metal is melted in a carbon crucible, and the alloy reacts with it to form an insoluble carbide which precipitates out in a self-healing skin on the crucible walls.

Purity—The purity of the ceramics used for crucibles can have a profound effect on the melt. Even trace elements are important.

For instance, boron, present as an oxide trace in a magnesia crucible, can contribute as much as 10 ppm of boron to the metal being melted.

Fortunately, this is not entirely bad. A Udimet-500 ingot that picked up additional boron from the crucible showed considerable improvement in reduction of area during stress rupture testing. The same boron increase improved the ingot's hot workability, but a larger pickup of boron could have had detrimental effects.

Fussy Procedures — The number of heats obtained from one of these fancy furnace linings depends a good deal on the care with which they are made. Magnesia and zirconia linings often have to be rammed in place and fired out on a suitable load, sometimes under partial vacuum.

Getting them dry enough is a big difficulty. Oven drying is a start, but not enough. Some users consider several wash heats necessary before the furnace can be considered thoroughly dry.

Vacuum pouring temperatures are likely to be on the low side, and this creates another difficulty. A layer of chilled metal usually remains in the crucible after pouring, and the force required to break away this skull frequently damages the refractory.

Degassing — Allied to vacuum melting, though on a much grander scale, are the vacuum degassing installations being operated by several steel mills for pouring gas-free forging ingots. The refractories for the sinkhead and packing materials must be specialized materials (such as high quality alumina bricks and cement) capable of withstanding a minimum temperature of 3000° F and resisting the erosion of the molten metal stream.

As with vacuum melting, complete drying of refractories is all-important. Heating at 1000° F for at least 24 hours is necessary for the sinkhead.

Furnace Restores Carbon

Republic Steel Corp.'s Union Drawn Div., Massillon, Ohio, has begun operation of a new continuous, six zone, prepared atmosphere furnace that can produce 1000 tons of "carbon corrected" annealed steel a month.

The furnace permits carbon lost by decarburization during hot working to be restored to the steel. Result: Parts can be made from cold-finished bars and induction hardened or otherwise heat treated without removing surface metal. Full surface hardness will be obtained.

Design of the furnace allows annealing of any type. Each of the six zones can be maintained independently at desired temperature. Prepared atmosphere is introduced into each zone separately.

Steel bars and wire coils are conveyed through the furnace on rollers whose speed can be varied to permit adjustment of annealing time. The cycle can be fixed at 1 to 24 hours. Maximum operating temperature is 1800° F.

Let me show you*

*Bob Marr,
P&J Representative
Houston, Texas.
Telephone: MOhawk 7-3964

how changing to a P&J Automatic helped Reed Roller Bit Company

JOB FACTS:

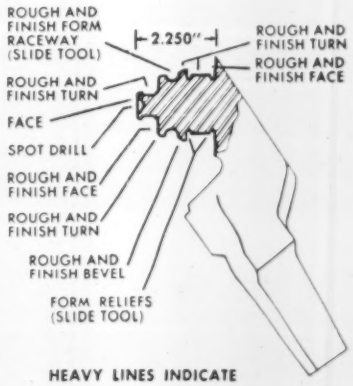
PART: *Lug for Oil Well Bit*

MATERIAL: *AISI 8720 Steel Forging*

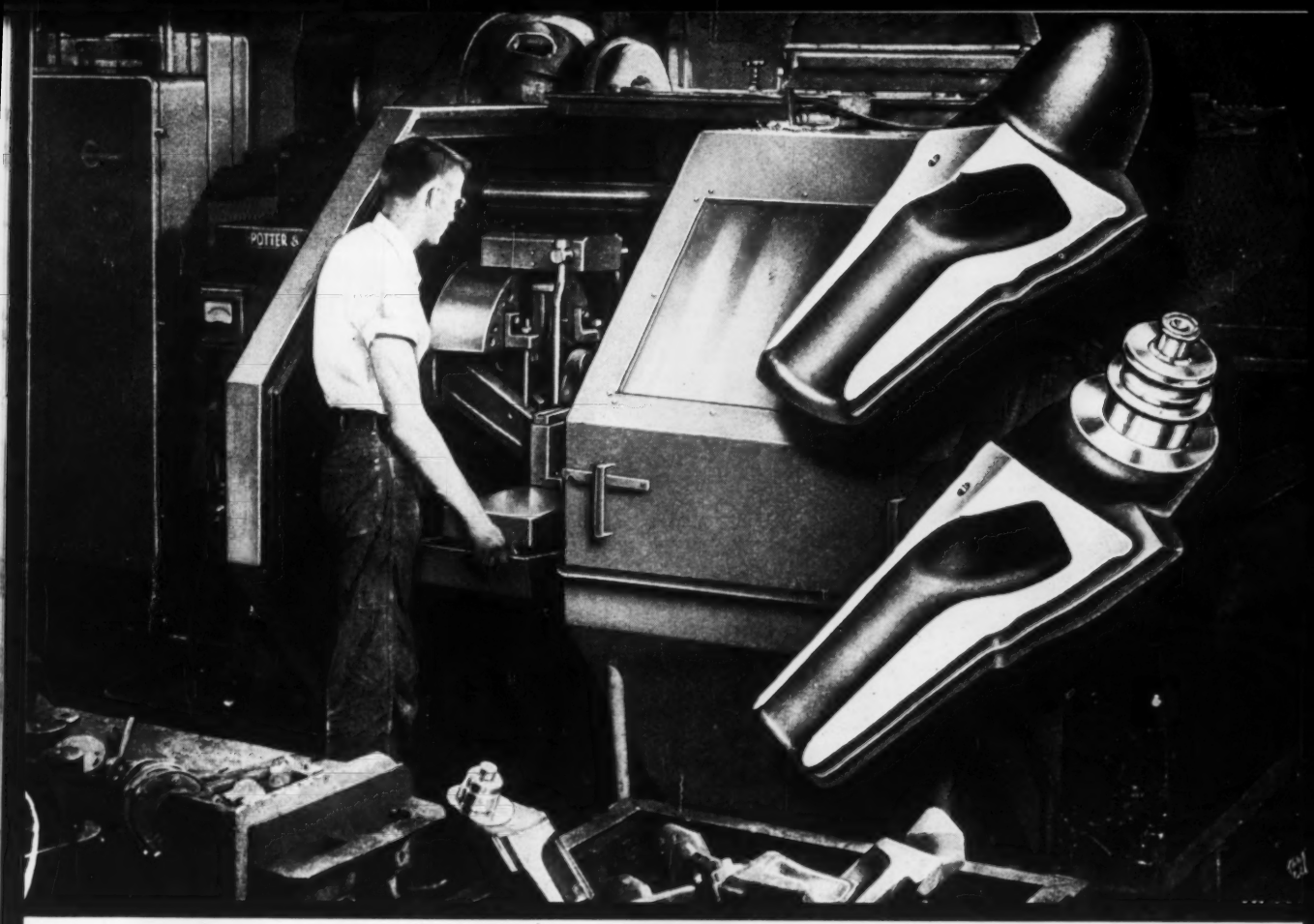
REQUIRED: *Several complex, precision cuts, with certain diameters held to .004" of nominal size.*

THE MACHINE: *A 6DRE-40 Automatic Turret Lathe*

THE RESULTS: *Part completed in single, fully automatic cycle. Machine cycle time just 4.5 minutes!*



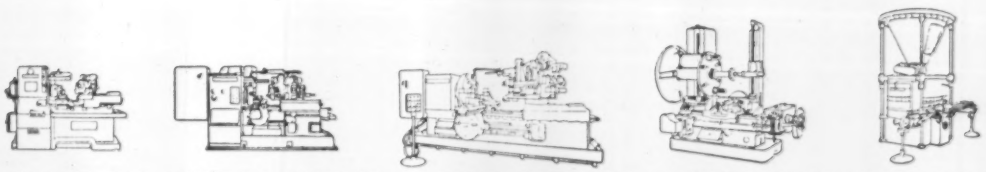
HEAVY LINES INDICATE MACHINED SURFACES



. . . ELIMINATE 4 MACHINES and REDUCE OPERATING COSTS!

One of our Potter & Johnston 6DRE-40 Automatic Turret Lathes was recently installed in Houston, Texas at the plant of the Reed Roller Bit Company . . . a leading producer of oil well drilling tools. Handling a series of complex cuts on a tough steel forging, this new P&J machine and one operator have replaced 5 semi-automatic machines and released four skilled operators for other important work. Machine cycle time has been cut to 4.5 minutes. These reductions have produced important money savings *plus* a big and badly needed increase in output. And in addition to meeting all these basic requirements, the 6DRE-40 has also proved its toughness. Despite heavy metal removal on an exceptionally tough alloy, this P&J Automatic is operated successfully on a 3-shift basis with time out only for routine cleaning and maintenance.

If – like the Reed Roller Bit Company – you have tough-to-machine jobs you'd like to turn out more economically, a switch from hand or semi-automatic machines to P&J Automatics can do the trick for you too! Act today. Ask the P&J Representative in your area to analyze your requirements and recommend a production plan to meet your specific needs. If you prefer, write direct to Potter & Johnston Company, Pawtucket, Rhode Island.



AUTOMATIC TURRET LATHES . . GEAR CUTTERS . . . PACKAGING MACHINES

POTTER & JOHNSTON

SUBSIDIARY OF PRATT & WHITNEY COMPANY, INC.

PRECISION PRODUCTION TOOLING SINCE 1898

THOMSON'S PROBLEM-SOLVING TEAM of design and application engineers now meet most special requirements with readily available standard rivets and quickly assembled standard rivet-setting machines.

NEW TEAM OF SERVICE EXPEDITERS coordinates sales, order entry, production, inventory control, finishing and shipping activities to gear Thomson's rivet deliveries to customers' production schedules.

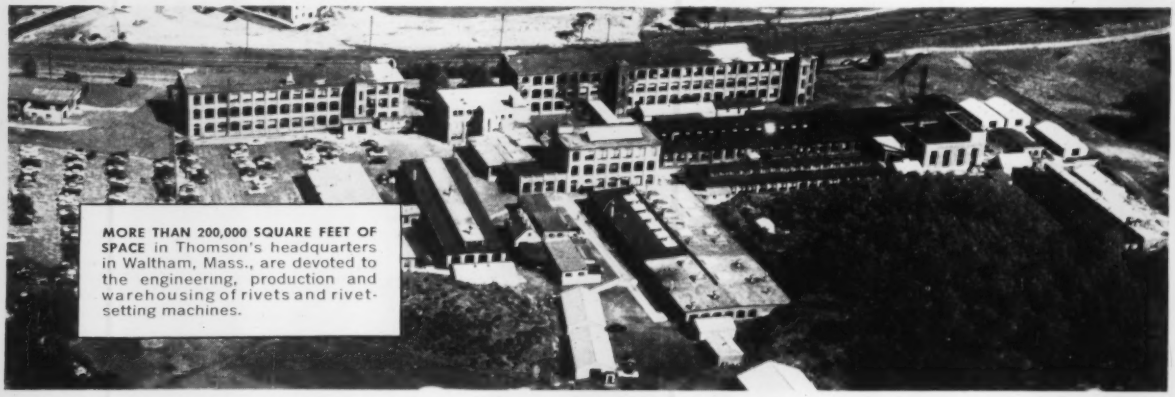
A CONSTANT INVENTORY OF SEVERAL MILLION POUNDS OF WIRE in more than 500 specifications backs up Thomson's mass-production capabilities.

20 MILLION A DAY....

America's largest rivet manufacturer tailors its production and inventory to today's fast delivery requirements

Judson L. Thomson now keeps 500 million rivets in stock so that you can *keep your inventory low* . . . and still have rivets *when you need them.* This new production and inventory system is based on the 800 most-used standard rivets. It's backed up by productive capacity exceeding 20 million rivets a day.

When your order comes in, semi-finished rivets are quickly finished to your specifications . . . and delivery is geared to *your production schedules.* Next time you need rivets, order from Thomson . . . first with the best in rivets and rivet-setting machines since 1885.

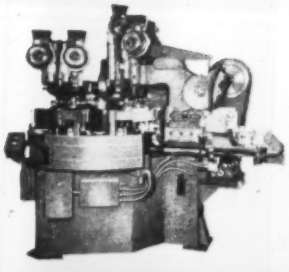


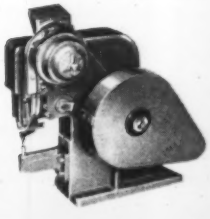
MORE THAN 200,000 SQUARE FEET OF SPACE in Thomson's headquarters in Waltham, Mass., are devoted to the engineering, production and warehousing of rivets and rivet-setting machines.

PRODUCTIVE CAPACITY EXCEEDING 42,000 RIVETS A MINUTE easily implements Thomson's new policy of maintaining an inventory of 500 million rivets in the 800 most-used standard specifications.

500 MILLION RIVETS CARRIED IN STOCK IN MORE THAN 800 STANDARD SPECIFICATIONS plus 8,000 rivet specifications completely tooled-up enable Thomson to meet ordinary, and extraordinary, demands in the shortest possible time.

SPEEDS RIVETS YOUR WAY





JUDSON L.
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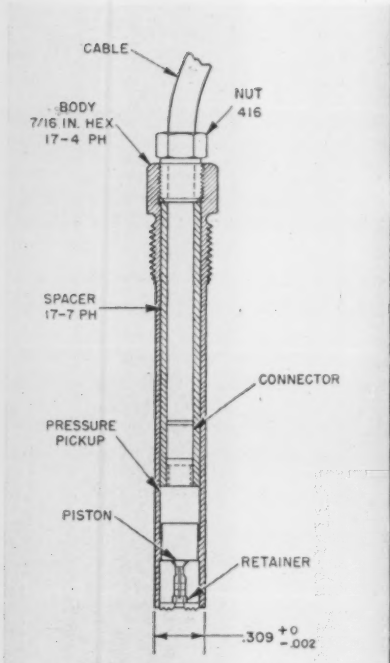
MORE THAN 200 STANDARD AUTOMATIC FEED RIVET-SETTING MACHINE MODELS, quickly assembled from stocked parts, include bench and floor types air, motor or manually operated, with single and multiple heads. Special work-handling and loading devices, radial or turret feeds and other accessories are available for accelerating assembly and speeding up production.



Welded 17-7 PH tubing is used as a spacer in this pressure transducer

Rifled bars of 17-7 PH steel are drawn into seamless tubing under the watchful eye of Richard Flinn, senior metallurgist at J. Bishop & Co.

Bishop Broadens Range of 17-7 PH

The company is drawing seamless tubing down to 0.375 in. diameter with a 0.035-in. wall. The finished product is solution annealed, will respond fully to heat treatment

ALLOY 17-7 PH tubing is gaining a reputation as a dual threat product: In its annealed state, it has the ductility needed for fabrication; precipitation hardened, it provides high strength and corrosion resistance.

Until recently, applications were limited to larger sizes of welded tubing because redrawing nullified the properties of the alloy that made it respond to heat treatment.

Drawing Problem Licked — J. Bishop & Co., Malvern, Pa. solved that problem through special drawing techniques and closely controlled annealing cycles. Small diameter, welded 17-7 PH tubing is a standard product in its line of special metals.

Bishop expects soon to offer seamless 17-7 PH tubing to its customers. It will mark another first for that company which specializes in solving metallurgical problems. The development was made possible through the firm's 116 years of experience with metals and collaboration with Armco Steel Corp., Middletown, Ohio, originator of the alloy.

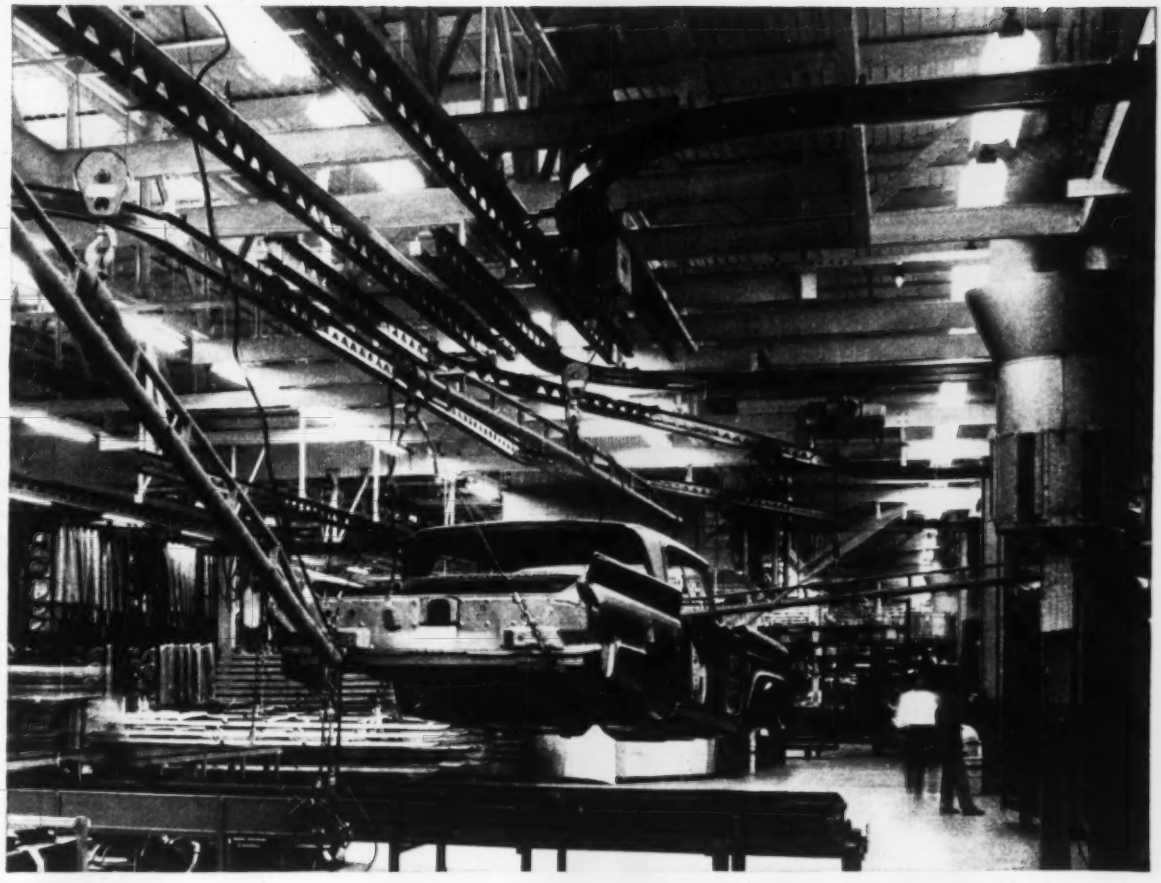
Progress to Date—S. S. Rice, chief metallurgist at Bishop, is working on two approaches to the seamless product: Starting with a rifled bar of the alloy or starting with an extruded bar, and in both cases drawing them down to size.

In the first phase of the project, Bishop started with rifled bars, 1 in. OD and $\frac{5}{8}$ in. ID, and drew them down to 0.375 in. OD with a 0.035-in. wall. It required seven passes through the drawing dies with 30 to 45 per cent reduction per pass. Six annealing cycles were necessary.

The finished tubing was in the solution annealed condition and responded fully to precipitation hardening treatments. Ultimately, Mr. Rice expects to draw seamless 17-7 PH tubing to hypodermic size (0.020 in. OD with 0.006 in. wall), as has been already done with 17-7 PH welded.

Work on reducing extruded tubing to smaller sizes is scheduled to begin soon.

Welded Product in Use—While



Lincoln Takes a Trambeam Tour...

SAFE, FAST, OVERHEAD HANDLING

Whiting Trambeam carries Lincoln and Continental bodies *overhead*—adds a new dimension to efficient handling in the Wixom, Michigan Lincoln assembly plant of Ford Motor Company. The system is 1,500 feet long, includes 7 switches and numerous curves.

Trambeam increases production efficiency by moving loads overhead safely and with pin-point precision. Pushbutton-controlled electric hoists provide the lifting "muscle." Heavier capacities are equipped with exclusive Whiting motor drives. For complete maneuverability throughout a system, Trambeam's distinctive "half-hexagon" rail is standard size for all capacities. Each system is engineered for minimum maintenance and lowest operating cost. See how you can build new efficiency into your plant with a Whiting Trambeam Overhead Handling System.

HERE'S A BOOK FULL OF "IDEAS IN MATERIALS HANDLING"

12 idea-packed pages . . . filled with actual installation photos of Trambeam Monorail systems for point-to-point transport and Trambeam Crane systems for complete area coverage. ASK FOR YOUR COPY. *Whiting Corporation 15643 Lathrop Avenue, Harvey, Illinois.*

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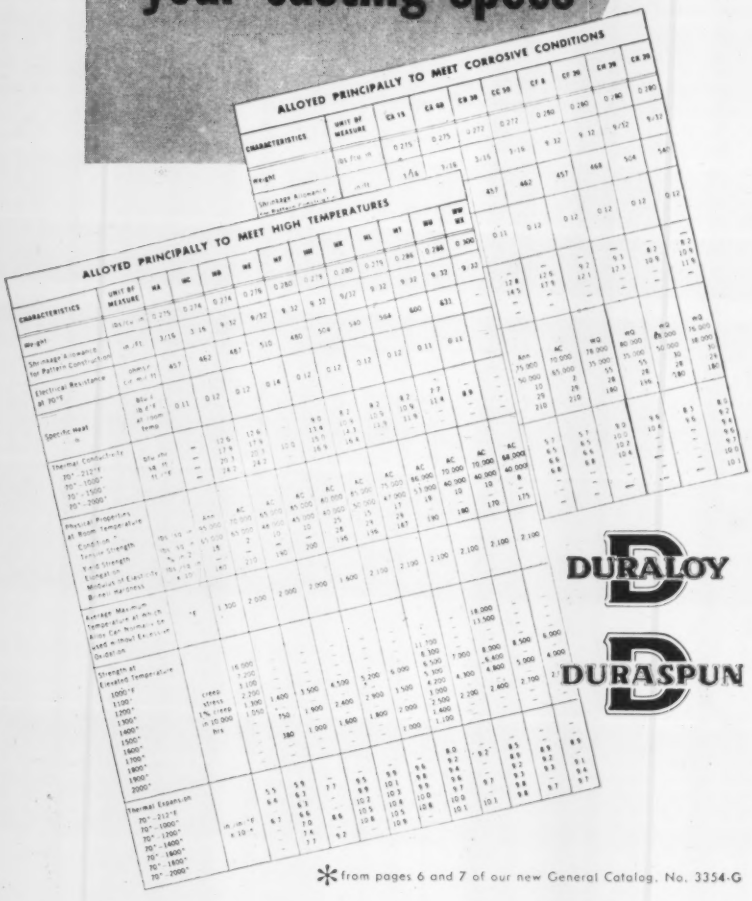
TABLES to help you select the proper alloy for your casting specs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As one of the pioneers in both static (1922) and centrifugal (1931) high alloy castings, we have a wealth of experience to focus on your high alloy casting problem. Send for our catalog, study it, and then let us help you get the best alloying combination to solve your corrosion, high temperature and/or abrasion problem.

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metallurgists at Bishop continue work on seamless 17-7 PH, the welded product is solving problems. It is being fabricated into parts like pump liners where erosion resistance is mandatory, and tubular coil springs that can be formed in the annealed conditions, then hardened to a spring temper.

Kistler Instrument Corp., North Tonawanda, N. Y., uses it in a piezoelectric transducer that measures pressures up to 100,000 psi. Maxwell Bennett, design engineer, explains that the use of 17-7 PH tubing allows his company to finish machine the part, then heat treat it to required hardness without warping.

The instrument manufacturer buys the tubing from Bishop with $\frac{1}{4}$ in. OD and 3/16 in. ID commercial tolerances. The tubing is machined on the outer and inner diameters and cut to length.

Typical use of the transducer is the study of ballistic combustion phenomena in gun barrels and measurement of force generated in shock tubes used in hypersonic research.

More on Way—Small diameter welded and seamless 17-7 PH tubing are products of Bishop's continuing research to solve the special problems created by advancing technology. Two more developments: Tantalum and columbium tubing drawn to $\frac{1}{8}$ in. diameter with 0.002 in. wall. The work was developed for the Atomic Energy Commission.

New Honeycomb Process

Temco Aircraft Corp., Dallas, has come up with a new method for fabricating brazed stainless steel honeycomb. The cost per square foot of panel produced by the process will be substantially lower than that produced by other methods, say company officials.

Called Temcombing, the process is continuous. It has a brazing cycle of 3 to 20 lineal inches a minute, depending on panel thickness, and will produce panels up to 4 ft wide.

It is fabricated on machinery designed by company engineers. The automated equipment brazes and heat treats the assembly simultaneously. Single and double curved panels can be made.

Correct fastener selection can keep costs down! You may be using a "special" fastener where a "standard" – at less cost – is available to do the same job. These savings may be considerable, particularly on production line products. How do you know when a "standard" will do just as well or even better? Just ask your nearest Lamson & Sessions salesman. They have all the information at their finger-tips... or can get it fast. There's almost a hundred years worth of fastener information in Lamson's files. The answer to your fastener problem is ready and waiting for you!

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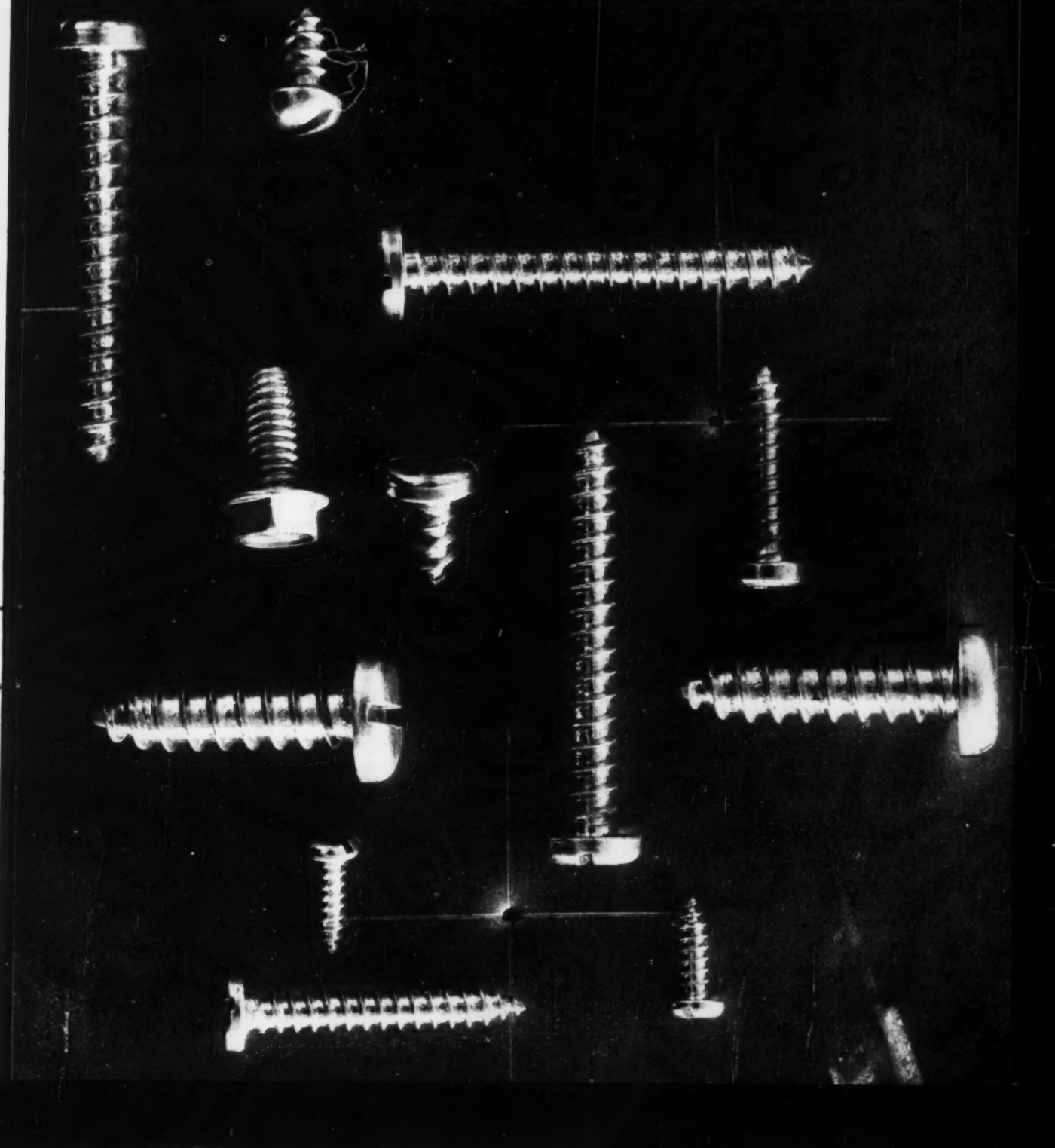


Unit Inhibits Rust

Reduction of storage area humidity to 35 per cent eliminates painting stock for protection

PINPOINT HUMIDITY control eliminates the need for painting steel stock immediately after it is formed. It's helping Penco Metal Products Div., Alan Wood Steel Co., Oaks, Pa., to cut labor and paint costs. The division makes steel lockers, shelving, and cabinets.

Previously, stock was painted before storage. Without such protection a film of rust formed on it within 24 hours. It meant that stock was stored in one color only and that it was easily scratched and spoiled before shipment.

Upgrades Service — Protective painting was eliminated by controlling the storage area at 35 per cent humidity. Improved control of inventory and over-all improvement in deliveries have resulted. With the one-color system, special orders called for repainting.

The entire plant (over 120,000 sq ft) is air conditioned. The chief component of the system is a 600-ton hermetic centrifugal compressor made by Trane Co., La Crosse, Wis. Thirteen air handling units are spaced throughout the manufacturing area.

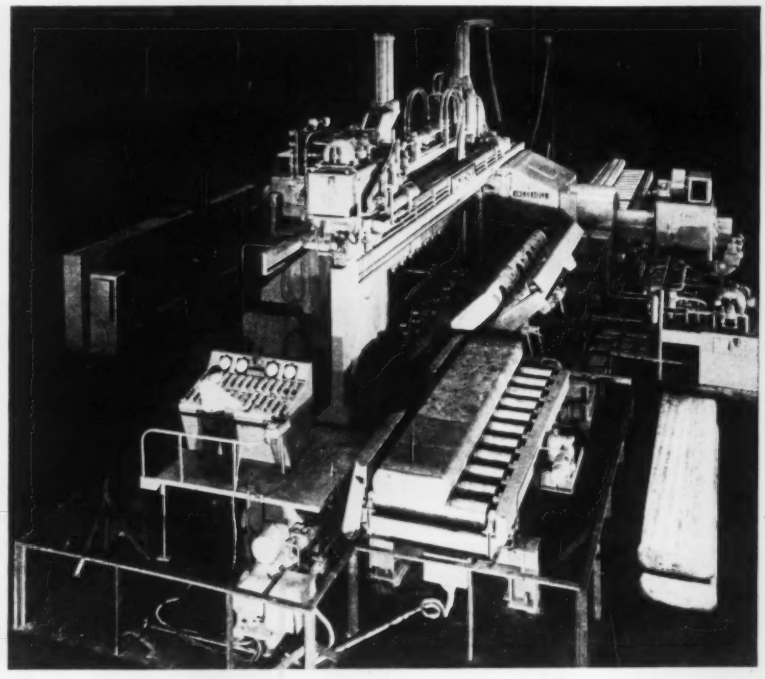
Fresh air is brought to these units through goosenecks on the roof. It is warmed or cooled and distributed through ducts and diffusing outlets to the working area. The average unit delivers 23,000 cu ft a minute.

A thermostat in the discharge controls the outside air damper. The temperature is specified, with a thermostat regulating a bypass valve in the water line, plus a regulator in the duct governing the percentage of outside air used.

Aluminum for Trucks

Aluminum is gaining a firm foothold in the transportation field. Latest entry is a lightweight flatbed trailer built by Williamsen Body & Equipment Co., Ogden, Utah.

The 40-ft rig can carry up to 50,000 lb as a result of its lower dead weight. The truck is made from high strength aircraft alloys.



Aluminum ingots are upended, positioned, clamped, and run through the machine at the rate of 30 an hour. The cycle is completely automatic

Mill Has Record Capacity

With 1000 hp per head, this duplex milling machine will scalp both sides of aluminum ingots—it takes chips off at the rate of 700 bushels a minute

FIVE duplex aluminum scalping machines, like the one built for Reynolds Metals Co., McCook, Ill., could process the entire annual domestic output of aluminum—and they could do it working only two shifts a day, five days a week.

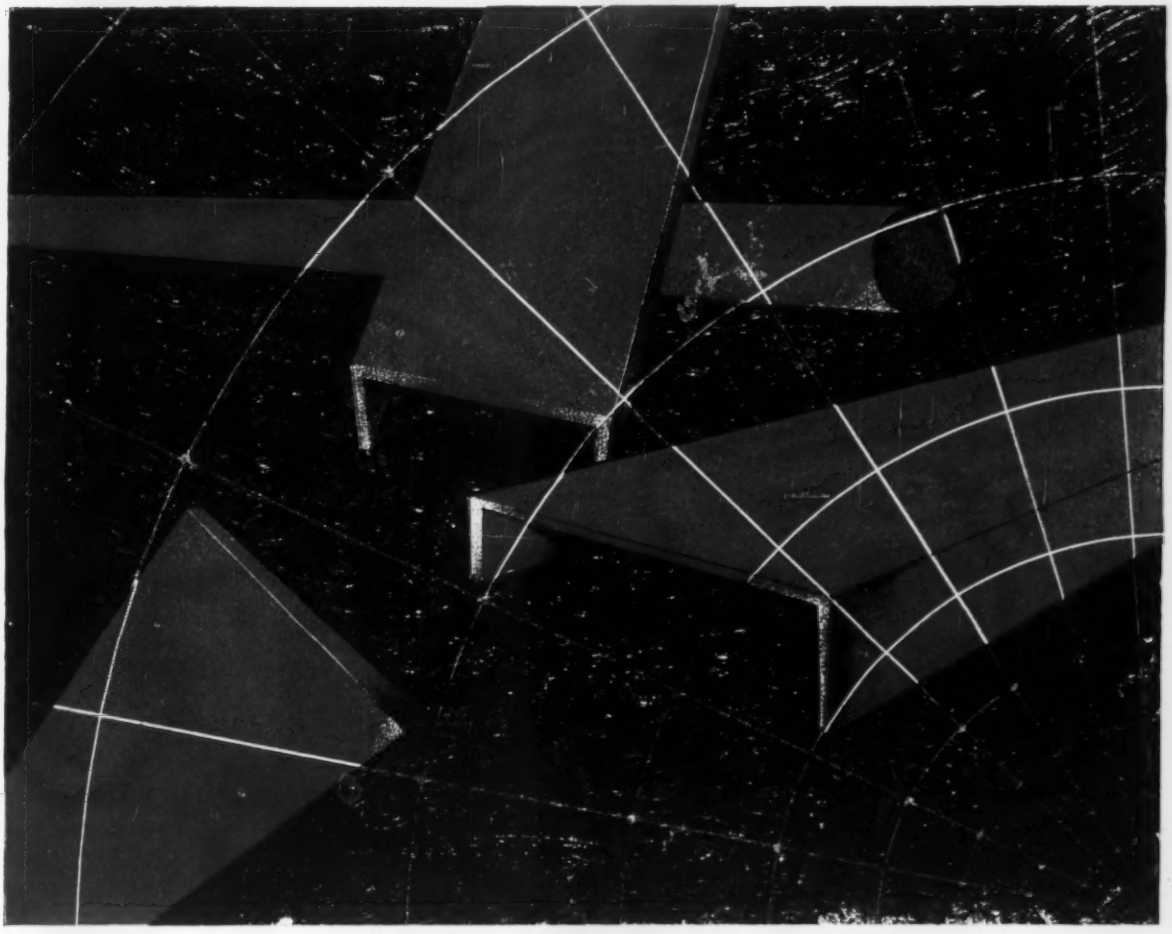
The giant machine, built at Ingersoll Milling Machine Co., Rockford, Ill., will mill both faces of ingots measuring up to 204 in. long, 6 ft wide, and 2 ft thick. It has handling capacity for ingots weighing more than 25,000 lb each.

Specifics—Each of the two milling cutters is 7 ft in diameter. They use replaceable carbide inserts. Each cutter is driven by a 1000-hp electric motor. This is the first of Ingersoll's numerous scalpers to be designed for high production on large aluminum ingots.

Under maximum stock conditions at high feed rates, the machine pulls a total of 2800 hp. To cut dry, a cutting speed of 15,000 sfpm was adopted.

Ingots will come to and leave the machine on powered roller conveyors. The automatic cycle begins as the ingot rolls onto an upending unit in front of the fixture. The ingot is loaded in the fixture, centered and clamped, fed through the cutters, and unloaded at the other end of the machine—all automatically.

Rate: 30 ingots an hour.



Use quality USS Stainless Steels

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By ordering USS Stainless Steels from a steel service center, you can avoid costly idle inventory and get delivery of the material you want . . . when you want it.

Here's your opportunity to combine the money-saving benefits of a steel service center with the fine, quality-controlled products of United States Steel. USS Stainless Steels are available right now, because of their strategically planned, wide distribution.

Remember, as a part of the American SteelWarehouse Association, your steel service center has been set up specifically to handle your immediate steel demands. So the next time you order stainless from your steel service center, be sure to specify *USS Stainless Steel.*

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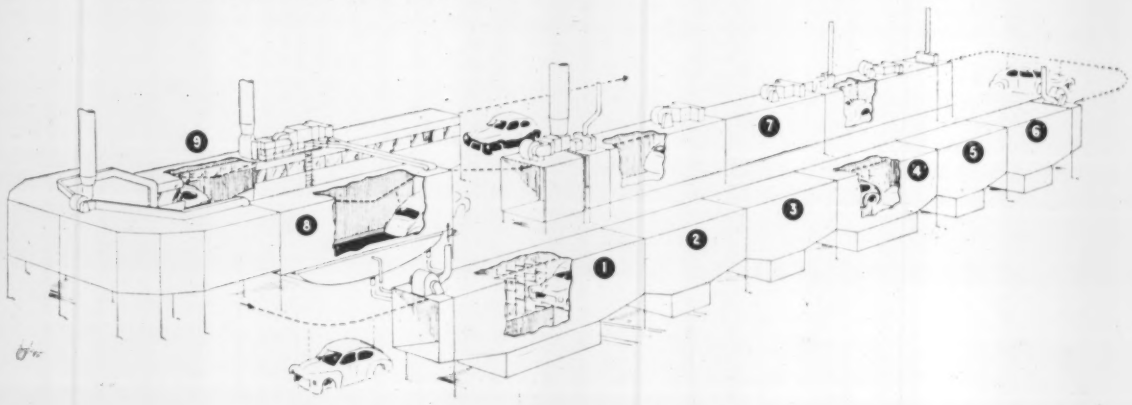
New Volvo Phosphating Plant



1. Degreasing zone. 2. Rinsing zone, water. 3. Rinsing zone, water. 4. Phosphating zone. 5. Rinsing zone, water. 6. Rinsing zone, water plus about 0.03 per cent chromates. 7. Drying oven. 8. Dipping bath. 9. Tunnel

Volvo Mechanizes Its

The Swedish automaker's new plant has six spray zones. Phosphate and chromate provide the rustproofing. Seven coats of synthetic lacquer complete the job

ONE of the reasons the Volvo has become so popular in the U. S. is that it is built to stand up to Sweden's climate. The car gets its rust prevention treatment at one of the most modern phosphating plants in Europe.

AB Volvo put its phosphating plant at Gothenburg into operation last fall when production outpaced the capacity of a rotary dip setup which treated only 11 bodies an hour. The new plant can process three times as many.

Prepared for Treatment—Bodies arriving at Gothenburg have been sprayed with a rust preventive to protect them on their journey from the company's pressed steel works in Olofstrom. They are hung on a roof conveyor where fenders, front ends, and hoods are fitted into place and the rust preventive washed off.

Bodies are examined for sheet metal imperfections and any necessary finishing work is done. They are conveyed to a semiautomatic changeover mechanism which transfers them to the roof conveyor. It carries them through the phosphating process.

Solution Sprayed On—The phosphating machine is 213 ft long. It has six spraying zones plus intermediate drain-off zones. In each spraying zone are several rows of nozzles mounted so the body is covered from every direction. The liquid runs off the bodies into tanks where it is kept at required temperature by heating tubes. Pumps return it to the nozzles.

When Volvo PV444 bodies have received their last coating of lacquer, they move to assembly. One completed auto leaves the assembly line every 3½ minutes

Phosphating Line

During its travel through the phosphating machine, the conveyor is protected from the sprays by special shields. When running, only the ends of the machine are open. To allow checking the bodies during their passage through the unit, some of the drain-off zones have glass covered inspection holes.

Progress through Machine — Functions of the six spraying zones:

1. Degreasing: Temperature is 140° F. The bath consists of a solution of weak alkaline phosphates and a wetting agent. There is also an additive which creates a fine crystalline film in the subsequent phosphating. Total concentration is low—only 0.2 per cent.
2. Rinsing: Only water is used. Temperature is 113 to 122° F.
3. Rinsing: Same as zone two.
4. Phosphating: Temperature is 131° F. The bath consists of an acid zinc-phosphate solution. The acid reacts on the surface of the metal, and phosphate crystals are precipitated. The film is about 0.00004 in. thick. The phosphate layer increases adhesion of the paint, rustproofs the surface, and assures that all surfaces are completely free from grease.
5. Rinsing: Same as zone two.
6. Rinsing: To increase rust protection, the water in this zone contains about 0.03 per cent chromates. Temperature is 113 to 122° F.

Dried and Painted—The bodies leave the machine and enter a 154-ft drying oven. Then they pass through a dipping bath containing an air-drying synthetic primer. The underparts of the bodies are dipped so that all nooks and crannies receive a thorough coating of paint.

After dipping, they pass through a tunnel where they are gently rocked by the conveyor so all surplus paint can run off. Another changeover mechanism feeds the bodies onto a third conveyor which takes them through a long tunnel to the painting department.

Volvo cars and station wagons are given seven coats of synthetic lacquer.

Don't overlook
the power of the worm!

H&S

WORM-GEAR SETS
insure smooth driving action
between perfectly mated members

Check these important advantages for your power transmission needs:

Smoothness of Operation • Ability to Carry Heavy Shock Loads
Compactness • Large Ratios • Reliability
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Horsburgh and Scott worm-gear generating methods guarantee perfect mates in each set, with worm threads and gear teeth having identical pressure angles and tooth contours. Resultant smooth conjugate action delivers maximum right angle power transmission with minimum power loss. H&S gives each set a controlled inspection on the correct center distance for tooth contact, backlash and smoothness.

To meet your requirements H&S makes Worm Gears up to 60 inches diameter—circular pitch range from ¼" to 3½". Ratios can be furnished from 3-5/9:1 to 100:1 . . . For prompt response from H&S engineers, just send an outline of your needs.

THE HORSBURGH & SCOTT CO.
GEARS AND SPEED REDUCERS
5112 Hamilton Avenue
Cleveland 14, Ohio

Clay Gun Updated

Hydraulically actuated model assures positive action and reduced maintenance

A NEW CONCEPT in clay guns for stopping the tapholes of blast furnaces has been introduced by Salem-Brosius Inc., Pittsburgh. The gun has features tuned to the trends toward larger, high top pressure furnaces, and automatic operation.

The gun is pedestal mounted and can be set up on either the right or left of the iron notch. Push-button controls permit either automatic or single stage cycling.

Simplified — All motions of the new clay gun are hydraulically actuated and electrically controlled through solenoids operating the hydraulic control valves. Nonflammable hydraulic fluid protects the system against the possibility of fire.

There are no gears, tracks, pinions, or racks, as in earlier guns, eliminating many maintenance points. Only five lubrication points are needed.

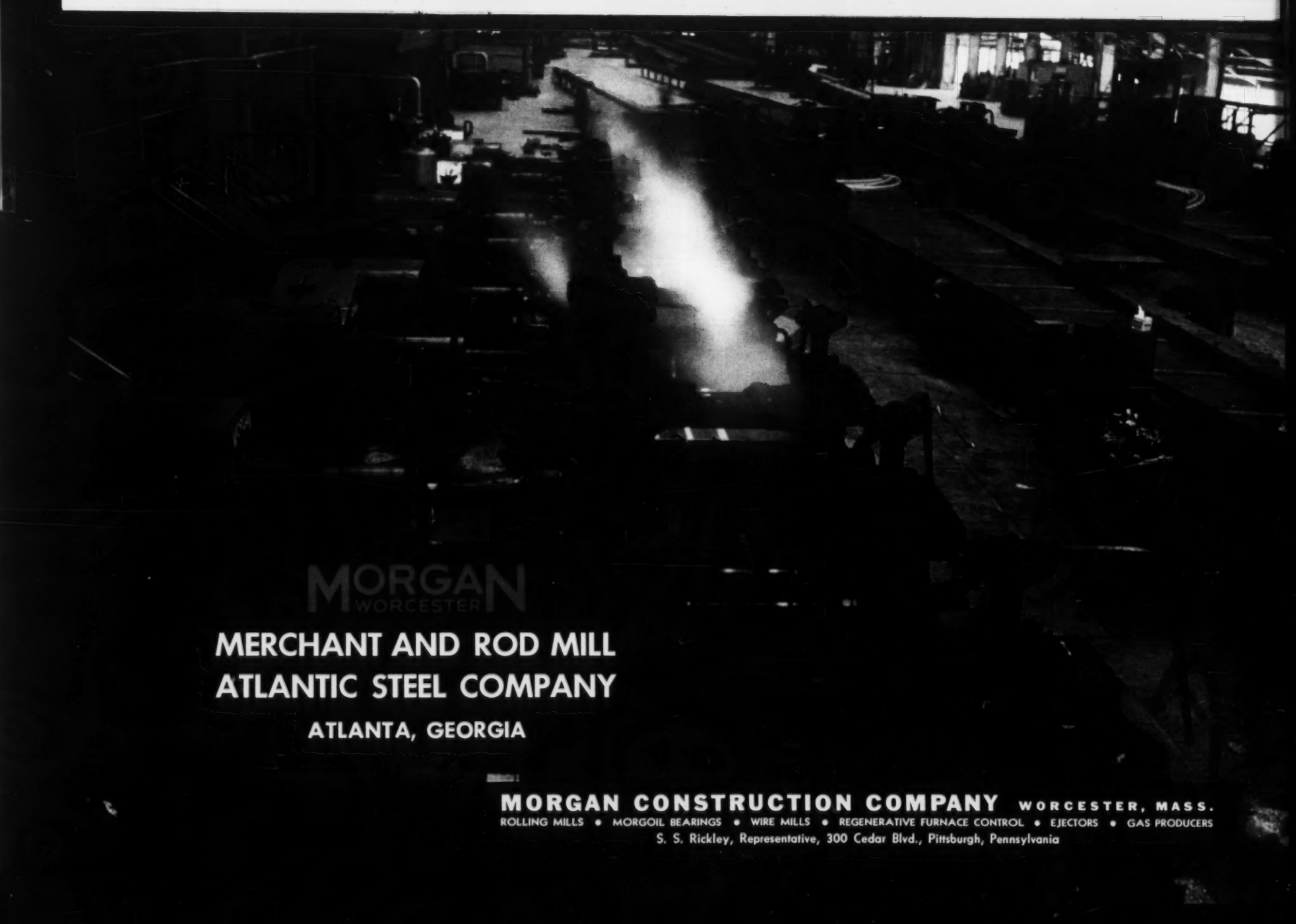
Motions—The pedestal is designed to be mounted 6 ft from the center line of the iron notch, allowing a 10½-ft semicircle in which to swing the gun. Relative motion between the clay-carrying chamber and the supporting structure has been eliminated, making the travel path into the taphole positive and accurate. The travel path can be adjusted.

The standard gun delivers clay at pressures up to 800 psi, but higher pressures are possible. An option of 12 or 15 cu ft clay barrels guarantees ample clay without refilling the barrel during plugging.

Nylon Tube Lasts Longer

Nylaflow pressure tubing has lasted up to 26 times longer than other hydraulic tubing used on a Sendzimir rolling mill winding reel at Wallace Barnes Co., Forestville, Conn. The previous product could not withstand the severe abrasion.

The flexible nylon tubing, made by Polymer Corp., Reading, Pa., carries oil at 150° F at a constant pressure of 600 psi with peaks of 1000 psi. The nylon tubing easily handles those temperatures and pressures and withstands flexing.



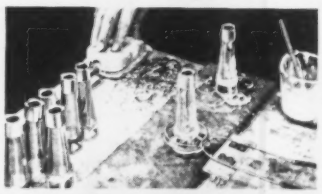
MORGAN CONSTRUCTION COMPANY WORCESTER, MASS.
ROLLING MILLS • MORGOIL BEARINGS • WIRE MILLS • REGENERATIVE FURNACE CONTROL • EJECTORS • GAS PRODUCERS
S. S. Rickley, Representative, 300 Cedar Blvd., Pittsburgh, Pennsylvania

A Brazing Story in Five Parts ...with Handy & Harman EASY-FLO

The Perlman Heat Treating Corp., Westbury, Long Island, brazes aircraft fuel system parts for WEBA, Inc. One of these is a fuel filter screen. It consists of five parts: two stiffeners, a screen and two end fittings, all of 302 stainless steel. All of these parts are joined by EASY-FLO silver brazing, using both induction and hand-torch heating methods.

A novel feature is the induction heating method used to braze the two stiffeners to the screen. It is sort of an "upside-down" method, through an asbestos board and carbon block, on which the screen rests with the EASY-FLO wire preform preplaced. The board and block permit enough passage of heat to melt the alloy to the mesh and stiffeners without excess overflow. Because the alloy won't wet the carbon block, the result is a clean, finished fillet.

The larger, cage-type fitting is HANDY-FLUX[illegible]s is the circular preform of EASY-FLO, then assembled and placed in an induction coil. The smaller end fitting is inserted in the screen, preheated by induction and then torch-brazed, with the alloy being hand-fed. Alloy cost for the entire assembly is ten cents.



The main point here is the adaptability not only of the alloy, but the *brazing method*. Hardly anything stands in the way of brazing that a little ingenuity can't solve, as Perlman Heat Treating has demonstrated. We'll be very glad to bring the full and very beneficial brazing story to your attention. More and more, people with all kinds of metal-joining problems are finding that Handy & Harman silver alloy brazing has most of the answers. Answers that may benefit you.

FIRST, BULLETIN 20 — This informative booklet will get you off to a good start on the values, techniques and economies of low-temperature silver brazing. A copy awaits your request.

Your NO. 1 Source of Supply and Authority on Brazing Alloys

HANDY & HARMAN — FOUNDED 1867 — QUALITY • SERVICE

HANDY & HARMAN

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Rings Made from Tubing

Changing from flat stock to welded tubing for heat resistant connector rings has eliminated five fabrication steps, scrap losses, and part failure at Wright Aeronautical Div., Curtiss-Wright Corp., Wood-Ridge, N. J.

The parts are used for segmented nozzles that collect hot exhaust gas from the cylinders of the firm's turbocompound engine.

How They're Made—The rings are manufactured from heat resistant N-155 alloy tubing made by Alloy Tube Div., Carpenter Steel Co., Union, N. J.

The method is simple. Rings are made by cutting off the proper length with a wet wheel and deburring. Material costs are reduced since there is virtually no waste and no splitting during sizing (the weld closure is free from voids or inclusions and is as strong as the surrounding base metal).

Previously, a cylinder was rolled from flat N-155 stock, clamped, tackwelded, seamwelded, ground, and cut into rings. The volume of scrap was high since some of the finished rings split, and 2 in. of the 15-in. lengths had to be scrapped to remove buildups and burns caused by starting and stopping the weld.

New Ferrochrome Produced

Economical chromium additions for steel and cast iron can be made with a new high-carbon ferrochrome, says Electro Metallurgical Co., a division of Union Carbide Corp., New York.

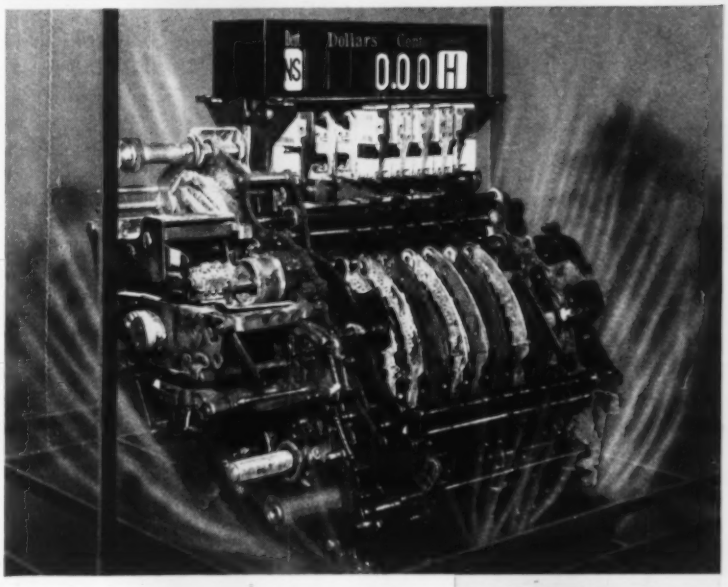
Called refined charge chrome, the alloy is a 4.5 per cent carbon alloy that sells for 22.5 cents per pound of chromium. It is available in maximum 2 per cent, maximum 3 per cent, and 10 to 12 per cent silicon grades.

The new ferrochrome will be of interest to melters of stainless and alloy steels, and to iron foundrymen for low-cost alloy additions to cupola or ladle.

Composition of the 2 per cent silicon grade is 50 to 55 chromium, 4.5 carbon, 2 silicon, 0.03 sulfur, 0.02 phosphorus, and 0.17 nickel. Except for silicon, other grades have the same analysis.

5,000 CASH REGISTER PARTS CLEANED IN 7½ MINUTES WITH

DETREX ULTRASONICS (SONICLEAN® PROCESS)



After years of service even NATIONAL CASH REGISTERS collect dust, oil and dirt. Now, DETREX Sonicleaning has replaced a costly hand-cleaning method of preparing integral parts for reconditioning.

In this specially designed Ultrasonic Soniclean* Degreaser sound waves literally "blast" the soil from the maze of parts. Three or four registers can be cleaned at once in a few minutes with the DETREX Soniclean* unit. After cleaning, quick inspection tells which parts need adjusting or replacing. NATIONAL CASH REGISTER technicians then make these reconditioned cash registers ready for many years of additional service.

* * *

DETREX, a pioneer in the Metal Cleaning and Processing field, is now the established leader! Offering the most complete combination of chemicals, equipment and services in the industry, DETREX can properly recommend, engineer and service any metal cleaning or processing application. **Write for information today!**

Depend on DETREX for Every Metal Cleaning and Processing Need

Ultrasonic Equipment
PERM-A-CLOR NA* (Degreasing Solvent)
Solvent Degreasers
Industrial Washers
Phosphate Coatings and Paint Bond Compounds
Rust Proofing Oils and Compounds
Alkali and Emulsion Cleaners
Extrusion and Drawing Compounds
Spray Booth Compounds
Aluminum Finishing Compounds

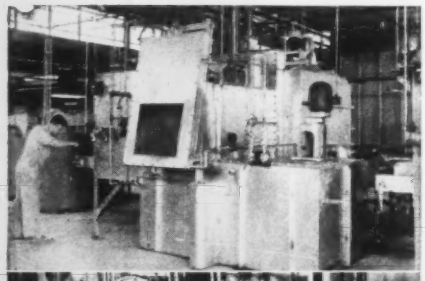
*Soniclean and PERM-A-CLOR NA are registered trademarks of

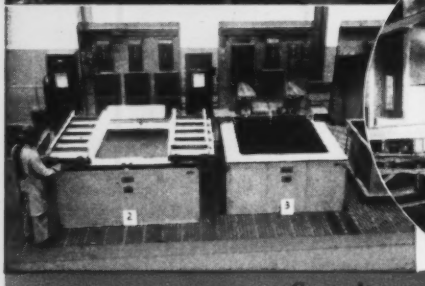
DETREX CHEMICAL INDUSTRIES, INC.

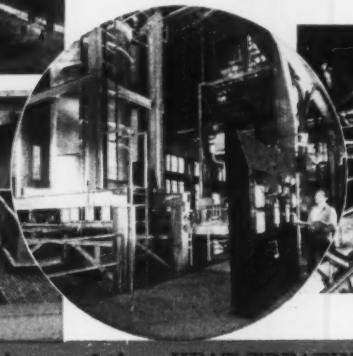
BOX 501, DEPT. S-8, DETROIT 32, MICHIGAN

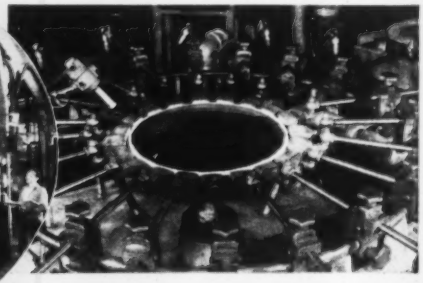
WHEN IT COMES TO HEAT TREATING—
"Do-It-Yourself" can sometimes be costly

Buying equipment and supplies to perform heat treating operations within your own plant is only one step in many that must be considered when contemplating the installation or expansion of a heat treating department.









Here are some of the factors that should be included when figuring the cost of operating your own heat treating department—of "doing-it-yourself" when it comes to heat treating:

- **Technical skill:** Trained operators whose skill is the result of years of experience are essential
- **Maintenance:** Rapid deterioration of equipment occurs unless there is constant repair, maintenance, and skillful handling of the equipment
- **Quality control:** Testing equipment and skilled operators are necessary to maintain uniformity and quality control of all heat treating operations
- **Sufficient equipment and supplies:** A great variety of equipment is needed to meet the requirements of annealing, brazing, hardening, carburizing, stress relieving, nitriding, and all other heat treating processes; and an endless variety of materials and supplies must be kept on hand.

These problems and many more have been solved by commercial heat treaters. They have the answers because heat treating is their business.

Every MTI commercial heat treater listed here is a specialist with complete service facilities under one roof. Each one has the facilities, equipment, skill and experience which will enable him to meet your most exacting heat treating requirements.

***Consult any of these* HEAT TREATING SPECIALISTS**

American Metal Treatment Co.
Elizabeth, New Jersey
Anderson Steel Treating Co.
Detroit, Michigan
Benedict-Miller, Inc.
Lyndhurst, New Jersey
Bennett Heat Treating Co., Inc.
Newark 3, New Jersey
Commercial Metal Treating, Inc.
Bridgeport, Connecticut
Cook Heat Treating Co. of Texas
Houston 11, Texas
The Dayton Forging & Heat Treating Co.
Dayton 3, Ohio
Dominy Heat Treating Corp.
Dallas, Texas
Drever Company
Philadelphia 33, Pennsylvania
Greenman Steel Treating Company
Worcester 5, Massachusetts
Fred Heinzelman & Sons
New York 12, New York

MTI — Master Craftsmen Partners in '57 — Metal Treating Institute

Alfred Heller Heat Treating Co.
New York 38, New York
Hollywood Heat Treating Co.
Los Angeles 38, California
Ipsenlab of Canada Ltd.
Toronto, Ontario
Ipsenlab of Rockford, Inc.
Rockford, Illinois
L-R Heat Treating Company
Newark, New Jersey
The Lakeside Steel Improvement Co.
Cleveland 14, Ohio
Metallurgical, Inc.
Minneapolis 14, Minnesota
Metallurgical, Inc.
Kansas City 8, Missouri

New England Metallurgical Corp.
South Boston 27, Massachusetts
Owego Heat Treat, Inc.
Apalachin, New York
Paulo Products Company
St. Louis 10, Missouri
Pittsburgh Commercial Heat Treating Co.
Pittsburgh 1, Pennsylvania
Pittsburgh Metal Processing Co., Inc.
Pittsburgh 15, Pennsylvania
The Queen City Steel Treating Co.
Cincinnati 25, Ohio
J. W. Rex Company
Lansdale, Pennsylvania
Stanley P. Rockwell Company
Hartford 12, Connecticut
Scott & Son, Inc.
Rock Island, Illinois
Syracuse Heat Treating Corp.
Syracuse, New York
Temperature Processing Co.
North Arlington, New Jersey

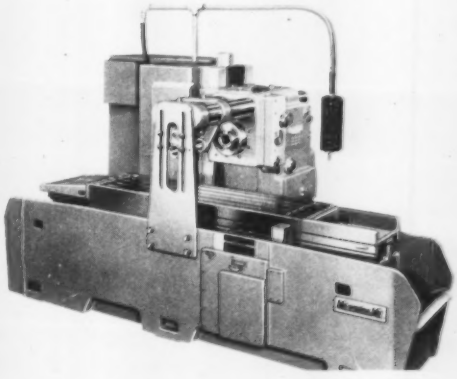
This advertisement sponsored by these Companies which are members of the Metal Treating Institute.

Milling Machine Programmed from Drawing

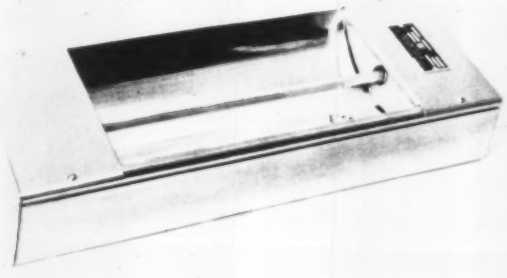
A bed-type milling machine, the Mil-waukee-Mil, provides automatic production milling by the dialing of desired results directly from the drawing. There are 72 standard models with a range of 7½ to 30 hp.

The operator programs the machine on the Dial-a-Cycle control panel, by phase switching. Several functions can be phased into one cycle—including quill retraction, rise and fall of head, and tracer control.

Two-way milling cycles with automatic center stop for load and unload can be made by pressing a button to resume the cycle. Stops can be made at any place in the cycle. A switch is provided to change the machine from automatic to manual operation. *Write*: Kearney & Trecker Corp., 6784 W. National Ave., Milwaukee 14, Wis. *Phone*: Greenfield 6-8300



Infrared Oven Units Provided in Any Length



The R-600 infrared oven sections have been developed for radiant heating, drying, and baking.

The aluminum housing and reflector have been designed to utilize a quartz-enclosed nichrome heating element. This gasless heating tube emits radiation at a wavelength of 2.3 microns, said to be most effective for industrial uses.

The element and its continuously extruded housing can be furnished in any required length, to operate at any voltage, and in a wide range of wattage ratings. *Write*: Lighting Div., Safety Industries Inc., P. O. Box 70, Milford, Conn. *Phone*: Trinity 4-6763

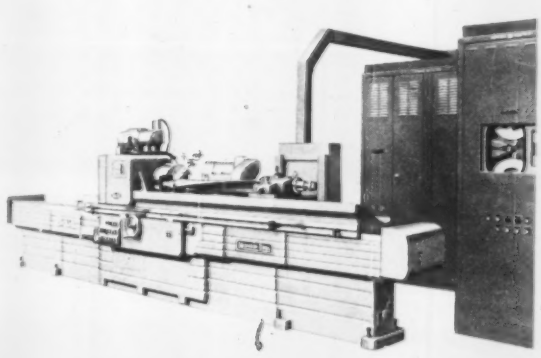
Profiler Applies Numerical Control with Work Rotation

Numeri-Trol profiling machines perform numerically controlled three-dimensional machining around the axis of the work.

Equipped for milling and grinding, they also incorporate grinding, dressing, and dressing compensation.

These units will produce cams, templates, and airfoil contours of steam turbine buckets and jet engine blades. Parts having irregular and twisted forms can be machined without cams or special tooling.

The instructions for machining operations are on tape. The time required to make the tape is only a fraction of that needed to make conventional tooling for an operator-controlled machine. *Write*: Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit 32, Mich. *Phone*: Townsend 8-3900

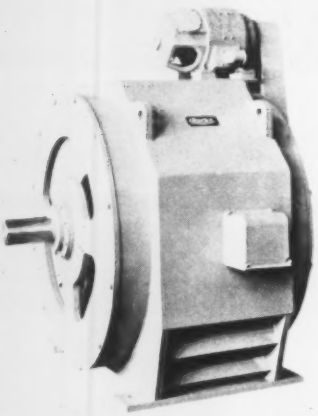


NEW PRODUCTS and equipment

Ratings Increased

The Frame 5200 series of synchronous generators operate at 900 rpm and are available in output ratings up to 1250 kva. Designed with an 0.8 power factor, these 3 phase, 60 cycle machines provide an output of 1000 kw. Output power in all standard voltages is provided through 6600 volts. Equivalent ratings are available for 50 cycles.

This larger frame series is easy to maintain. It has rigid bracket bearing construction, all welded steel dripproof construction, baffled ventilating system, full damper



(amortisseur) winding, and Class A or B insulation. *Write*: Columbia Electric Mfg. Co., 4519 Hamilton Ave., Cleveland 14, Ohio. *Phone*: Endicott 1-8060

Furnace Control Accurate

This pushout-type induction melting furnace has a 50 to 5000 lb capacity, high melting speeds which minimize metal loss, and accurate metallurgical control.

For nonferrous alloys, the furnace offers advantages in transfer time and interchangeability of crucibles when no contamination from one alloy to another can be tolerated. Dual or single units are available.

Motor-generator sets of 30 to 1250 kw provide frequencies from 960 to 10,000 cps.

A tilting-type furnace is also offered. *Write*: Industrial Electronics

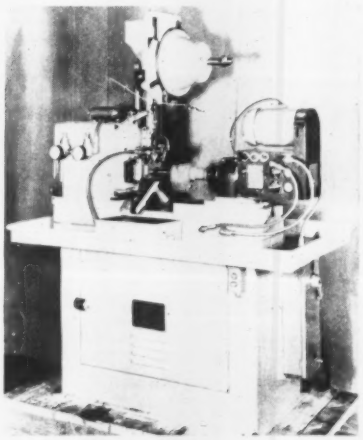
Dept., Westinghouse Electric Corp., P. O. Box 416, Baltimore 3, Md. *Phone*: Edmonson 6-2300

Clamps Work Axially

The Beco Model 409 drilling or tapping machine accurately positions and securely holds rivets or other similar headed parts for secondary operations. It's fully automatic, hopper fed.

The heads of the work are clamped axially, eliminating distortion which would cause the tool to weld to the workpiece. Other advantages are inexpensive tooling, fast operation, and absence of cams for spindle advance.

Electrically controlled compressed air governs spindle advance and retract speed. *Write*: Batchelder Engineering Co. Inc., 125 Main St.,

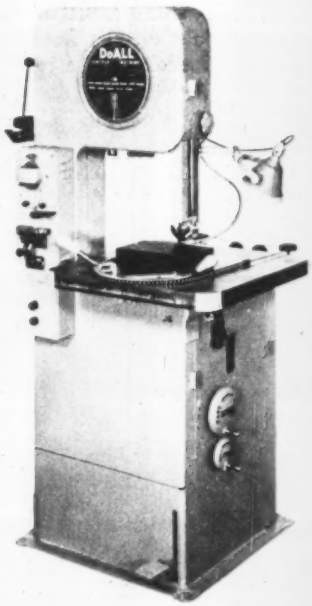


Springfield, Vt. *Phone*: Turner 5-3001

Bandsaws Accurate

The Model 16M (shown) and Model 30M band machines combine the compact and flexible design of the earlier SFP series with the power and rigidity of the standard, heavy duty machines—and at a lower price.

Accuracy is assured under the heaviest cuts by the heavy tool post and tool post guide. A range of 50 to 5200 fpm permits both models to contour saw any machinable material as well as band file, band polish, and friction saw thin ferrous work. *Write*: DoAll Co., Des



Plaines, Ill. *Phone*: Vanderbilt 4-1122

Sensitivity Increased

The Type 24-110A electronic leak detector is a mass spectrometer "focused" on mass 4 (helium). It locates and gives a precise indication of the size of leaks in pressure, vacuum, and hermetically sealed equipment.

Leakage rate is determined by a visual indicator. An audible alarm allows the operator to locate leaks while he concentrates on probing the suspected area. *Write*: Consoli-

dated Electrodynamics Corp., 300 N. Sierra Madre Villa, Pasadena, Calif. *Phone*: Sycamore 6-9381

Allows Rapid Testing

A re-engineered testing unit, the NC-242, employs the wet magnetic particle inspection method—visible or fluorescent. It provides a rapid means for production testing of small ferrous parts up to 24 in. long.

The suspended magnetizing coil and heads permit conveyorization of work through or across the unit.

The coil, which pivots and slides along the overhead track, may be positioned between the heads for both longitudinal and circular magnetization of parts, moved to the right for separate coil magnetization, or to the left for storage. *Write*: Magnaflux Corp., 7300 W.

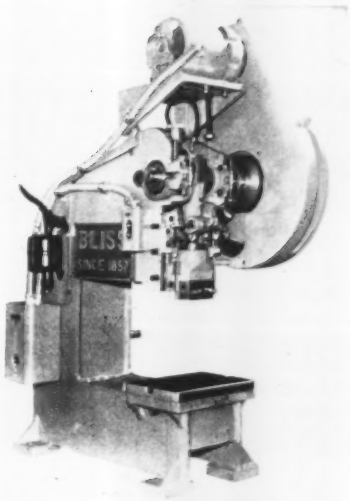
Lawrence Ave., Chicago 31, Ill. *Phone*: Underhill 7-8000

Press Handles Wide Sheets

High speed punching, cutting, and forming of large, wide sheets can be done on this 7 ton, deep throat, bench press. The 018-DT promises increased production with minimum downtime.

All parts, other than frame, are interchangeable with Bliss bench and inclinable presses of the same tonnage. A 1¼-in. stroke is standard. A maximum stroke of 2½ in. is available.

Throat depth is 14 in. The machine has a fully stress relieved frame. *Write*: E. W. Bliss Co.,



1375 Raff Rd. N. W., Canton, Ohio. *Phone*: Greenwood 7-3421

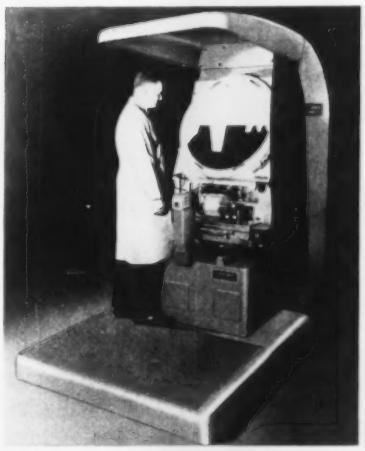
Thermocouple Expendable

Molten steel temperatures can be taken with this throwaway immersion thermocouple. The manufacturer says it is comparable in cost with present methods.

The unit consists of a length of standard pipe with a handle at one end and a fitting at the other. The fitting holds a cartridge and a 4-ft paper sleeve which are expendable and easily replaced for each reading. *Write*: Leeds & Northrup Co., Philadelphia 44, Pa. *Phone*: Davenport 9-4900

Inspects Heavy Pieces

This extended range, optical comparator (Model FC-30ER) will accurately inspect extralarge, heavy parts. It is possible to project over and under objects up to 8 in. in diameter without interference with lens or viewing screen.

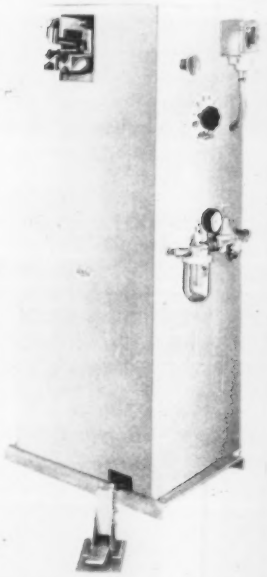


Up to 10 in. of lateral measurement is provided with a rugged, roller mounted table. Measurement up to 8 in. is permitted through the double-spindle table support. This, combined with the heavy-duty table, provides sufficient rigidity for objects weighing 200 lb or more. *Write*: Jones & Lamson Machine Co., Springfield, Vt. *Phone*: Turner 5-2121

Buttwelder Air-Operated

The Model BW air-operated buttwelder makes up to 2500 welds an hour in semiautomatic operation.

A step-in die permits fast alignment of light wires. The unit welds from 1/16 to ½ in. diameter with the same jaw setting. Each jaw has an independent cylinder. A separate cylinder does the pushing. The unit has a built-in timer. *Write*: Alphil Spot Welder Mfg. Corp., 1058 Pacific St., Brooklyn 38, N. Y. *Phone*: Nevins 8-3603



Unit Computes Cut Data

A portable computer, the Kennametal Cutmeter, puts into convenient form the relationships of feed, speed, depth of cut, and power, which have been established through metal cutting research.

Practical feeds and speeds for

NEW PRODUCTS and equipment

starting a job are quickly obtained by direct setting of the dials. For more detailed recommendations, charts are provided for adjusting to unusual tool geometry or wear limits. *Write*: Kennametal Inc., Latrobe, Pa.

Lift Truck Inexpensive

A telescopic lift truck, the Telescopic 99, carries a synchronized, 12 volt, heavy duty system. It has a load capacity of 1000 lb, and a lifting height to 160 in.

Other models of the series lift to 72, 90, 110, and 130 in. *Write*: Big Joe Mfg. Co., Wisconsin Dells, Wis.

Conveyor Sold as Kit

Kwik-Roll is a packaged conveyor kit that can be quickly assembled

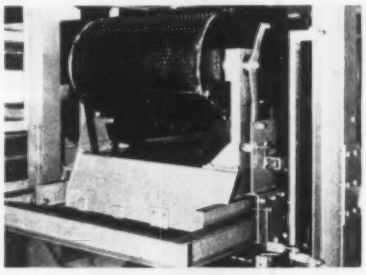
into sturdy sections to meet requirements. Available in 10 and 5 ft straight sections, the widths are 12, 16, 20, and 24 in. Curved sections are offered in the same widths.

The frames bolt together and rollers spring into place. *Write*: Mechanical Handling Systems Inc., 4600 Nancy Ave., Detroit 12, Mich. *Phone*: Twinbrook 2-1210

Door Is Automatic

A horizontal door that opens and closes automatically is a feature of this metal processing barrel that can be used for cleaning, phosphating, blackening, Lubrite, Bonderizing, chromate treatments, and pickling.

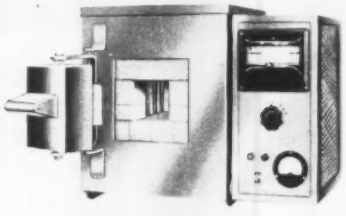
Rotation of the barrel actuates a



mechanism that closes the door. Rotation is reversed to open the door and discharge the load. *Write*: Hanson - Van Winkle - Munning Co., Church Street, Matawan, N. J. *Phone*: Matawan 1-1000

Provides Uniform Heat

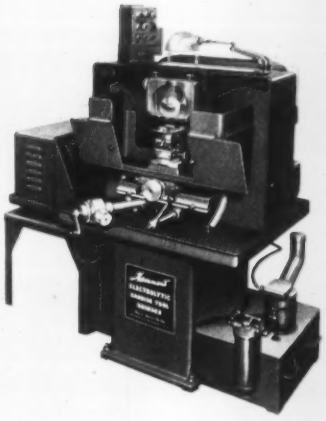
This compact Rad-O-Glow furnace provides 60 sq in. of radiation



surface. It can be used for hardening of high-speed steels, annealing alloy steels, sintering powdered metals, copper brazing, aging, and forging. *Write*: Blue M Electric Co., 138th and Chatham Street, Blue Island, Ill. *Phone*: Fulton 9-5000

Machines Combined

The Model CBE-66 chip breaker and oscillating cup wheel grinder

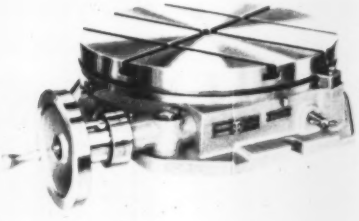


combines two machines. It provides an ideal all-around grinder for complete single-point tool grinding.

Operator fatigue and grinding time are lessened. Consumption of diamond wheels is cut 80 to 90 per cent. *Write*: Hammond Machinery Builders, 1611 Douglas Ave., Kalamazoo, Mich. *Phone*: Fireside 5-7151

Rotary Table Redesigned

This rotary table line has easily read dials, one-piece wormshafts, enclosed base, precision ground



turntables graduated in 1 degree increments, and easy to follow index plates.

It is used in cutting of segments of circles, circular slots, and irregular contours; milling clutch teeth; and locating angularly spaced holes or slots.

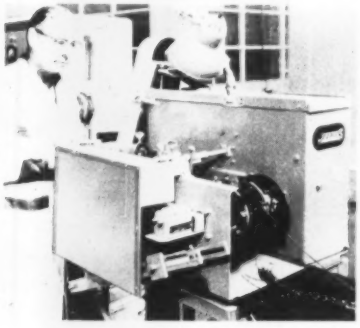
The units are available in six diameters ranging from 9 to 25 in., and eight models. *Write*: Troyke Mfg. Co., Cincinnati 41, Ohio. *Phone*: Princeton 1-9323

Cuts and Strips Wire

The Acme wire cutter and stripper is completely automatic from unreeling of insulated wire, through simultaneous cutting and stripping.

to stacking pieces in a trough.

Designed for high production operations, the machine handles 1 to 40 in. lengths at a rate of over 9000 an hour, or 80 to 120 in. lengths at a rate of about 3000 an hour. *Write*: Jennings Machine Corp.,



3452 Ludlow St., Philadelphia 4, Pa. *Phone*: Evergreen 6-2420

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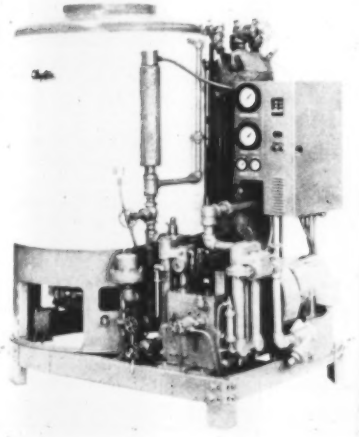
A controlled circulation type, 160 hp, oil fired steam generator uses a single pass, continuous water tube coil. Counterflow circulation assures maximum heat transfer and 80 per cent average thermal efficiency.

Boiler horsepower from 60° F feed water is a normal 160 with maximum rating of 175. A full head of steam is available from a cold start inside of three minutes. *Write*: Clayton Mfg. Co., 449 Temple City Blvd., El Monte, Calif. *Phone*: Atlantic 6-1161



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If there's dust escaping from your factory stacks, it's a matter of economic logic to ask Buell's engineers to make an analysis. Often those dusts are valuable: in eight out of ten installations recovered dusts pay for the collection system. Not only do Buell engineers have decades of experience in the field and in the laboratory to draw upon, but a full-scale-operating Test Precipitator can be installed, providing absolute proof of collector efficiency in your own plant before you make the major investment involved in a permanent collection system.

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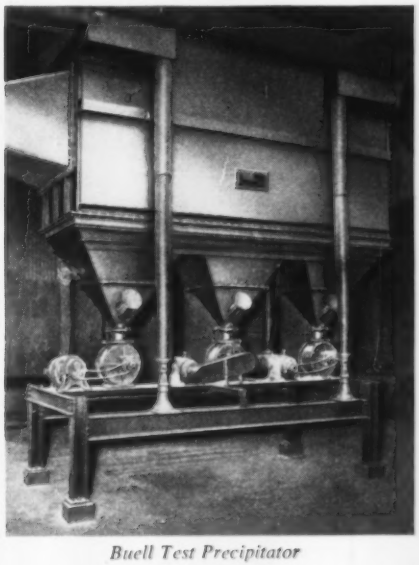

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NEW Literature

Write directly to the company for a copy

Gravity Conveyor

The Rapid-Wheel gravity conveyor is described in a 16-page brochure, RW-58. Selection of conveyors, construction features, and accessories are discussed. Rapids-Standard Co. Inc., 342 Rapistan Bldg., Grand Rapids 2, Mich.

Solid Film Lubricant

Surf-Kote M-1284, a solid film lubricant, is described in a bulletin. It is a matrix-bonded, solid, dry film type containing molybdenum disulfide. It withstands extreme pressures and temperatures. Hohman Plating & Mfg. Co., 814 Vermont Ave., Dayton, Ohio.

Polishing and Buffing

A catalog describes straight line, automatic polishing and buffing machines. Seven types of units are covered in individual sections. Acme Mfg. Co., 1400 E. Nine Mile Rd., Detroit 20, Mich.

Barrel Plating

A bulletin describes barrel plating equipment. Barrel units, cylinders, tanks, rectifiers, loading stands, storage and transfer units, final rinse units, and dryers for plating operations are covered. Udylite Corp., Detroit 11, Mich.

Wet Process Chain

Bulletin 22B8565A describes Thermopruf chain for use in wet process cement kilns, lime sludge kilns, and wash mills. It provides up to 33⅓ per cent more heat transfer surface. Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.

Conveyor Furnaces

Bulletin 5711 describes the variable speed electronic drive, automatic temperature controls, and sinuous wound ribbon type heating elements of the LAC series conveyor furnaces. C. I. Hayes Inc., 822 Wellington Ave., Cranston 10, R. I.

Roller Conveyors

A catalog sheet describes lightweight roller conveyors for general package handling. Samuel Olson Mfg. Co., 2418 Bloomingdale Ave., Chicago, Ill.

Resistance Welders

A catalog describes flash, projection, butt, spot, and gun welders made for all voltages and frequencies. Covered is a complete line of resistance welders. Alphil Spot Welder Mfg. Corp., 1058 Pacific St., Brooklyn 38, N. Y.

Resistant Coating

Bulletin No. 258 describes a phenolic-epoxy high resistant coating for structural steel and roofs in pickling areas and places where corrosion problems exist. Wisconsin Protective Coating Co., Green Bay, Wis.

Wire Rope Conveyors

Bulletin NR-6C tells about a method of constructing belt conveyor systems with steel wire rope instead of rigid framing. The Limberope conveyor suspends flexible idlers between parallel strands of rope. Joy Mfg. Co., Henry W. Oliver Bldg., Pittsburgh 22, Pa.

Recessing Tools

Catalog T-6 describes recessing tool operations and applications, and a complete line of tools, fixtures, arbors, gages, heads, bits, bars, and special tools. Maxwell Industries Inc., 493 Fifth Ave., Ashtabula, Ohio.

Rotary Tables

Circular No. 619 covers precision rotary tables in horizontal, vertical, and tilting types, motor driven, optical, automatic indexing, and numerical control models. Pratt & Whitney Co. Inc., Charter Oak Boulevard, West Hartford 1, Conn.

Leasing

This booklet provides a realistic analysis of leasing in terms of working capital. It outlines the topic as a source of potential profit. United States Leasing Corp., 130 Montgomery St., San Francisco 4, Calif.

Wire Rope Splicing

A 38-page handbook on splicing techniques tells users how to obtain longer life from their wire rope and sets forth safety standards. The book covers various eye splicing methods, endless splices, preformed and Lang Lay wire rope splicing, and the Chicago technique. Grommets, socketing of ferrules, and efficiencies of wire rope attachments are covered. Union Wire Rope Corp., 2160 Manchester Ave., Kansas City 26, Mo.

Charts on Metals

Two charts show the melting points of metals and their densities. Melting points range from tungsten to mercury; densities from osmium to lithium. Metals & Fabrication Div., Fansteel Metallurgical Corp., North Chicago, Ill.

Cast Stainless

"Technical Data on Cast Stainless Steel" lists 29 heat and corrosion resistant alloys which are available for the manufacture of custom castings and a proprietary line of valves and fittings. The folder contains a cross reference chart of ACI, AISI, SAE, and ASTM designations. Foundry Products Div., Cooper Alloy Corp., Hillside, N. J.

Electrostatic Spraying

A catalog illustrates electrostatic spraying equipment and systems developed for industry. Ionic Electrostatic Corp., 111 Monroe St., Garfield, N. J.

Custom Rods

A brochure describes lengths, diameters, thread lengths, head styles and sizes, and materials used in custom-made rods. Brainard Rivet Co., Girard, Ohio.

Press Brakes

Bulletin 13-693 describes a line of press brakes. It gives specifications on machines, dimensions, and force required to bend mild steel with standard Air Bend dies. Taylor-Winfield Corp., Warren, Ohio.

Color Anodizing

How one machine anodizes automobile parts many different colors is described in a 4-page leaflet. Hanson-Van Winkle-Munning Co., Church St., Matawan, N. J.

Activation Analysis

The No. 11 issue of "Radioactivity at Work" describes this firm's activation analysis service. It's aimed at quality control on a high level in the manufacture and processing of chemicals, metals, metal products, and other areas in which control of trace elements in small quantities is necessary. Dept. R, Nuclear Science & Engineering Corp., Box 10901, Pittsburgh 36, Pa.

Worm Gear Drives

Bulletin 150 provides information on worm gearing, points out its advantages, and gives design and manufacturing facts. Cleveland Worm & Gear Co., 3249 E. 80th St., Cleveland 4, Ohio.

Wire Cloth

A sample kit illustrates a wide range of wire cloth available for modern industrial applications. Michigan Wire Cloth Co., 2100 Howard, Detroit 16, Mich.

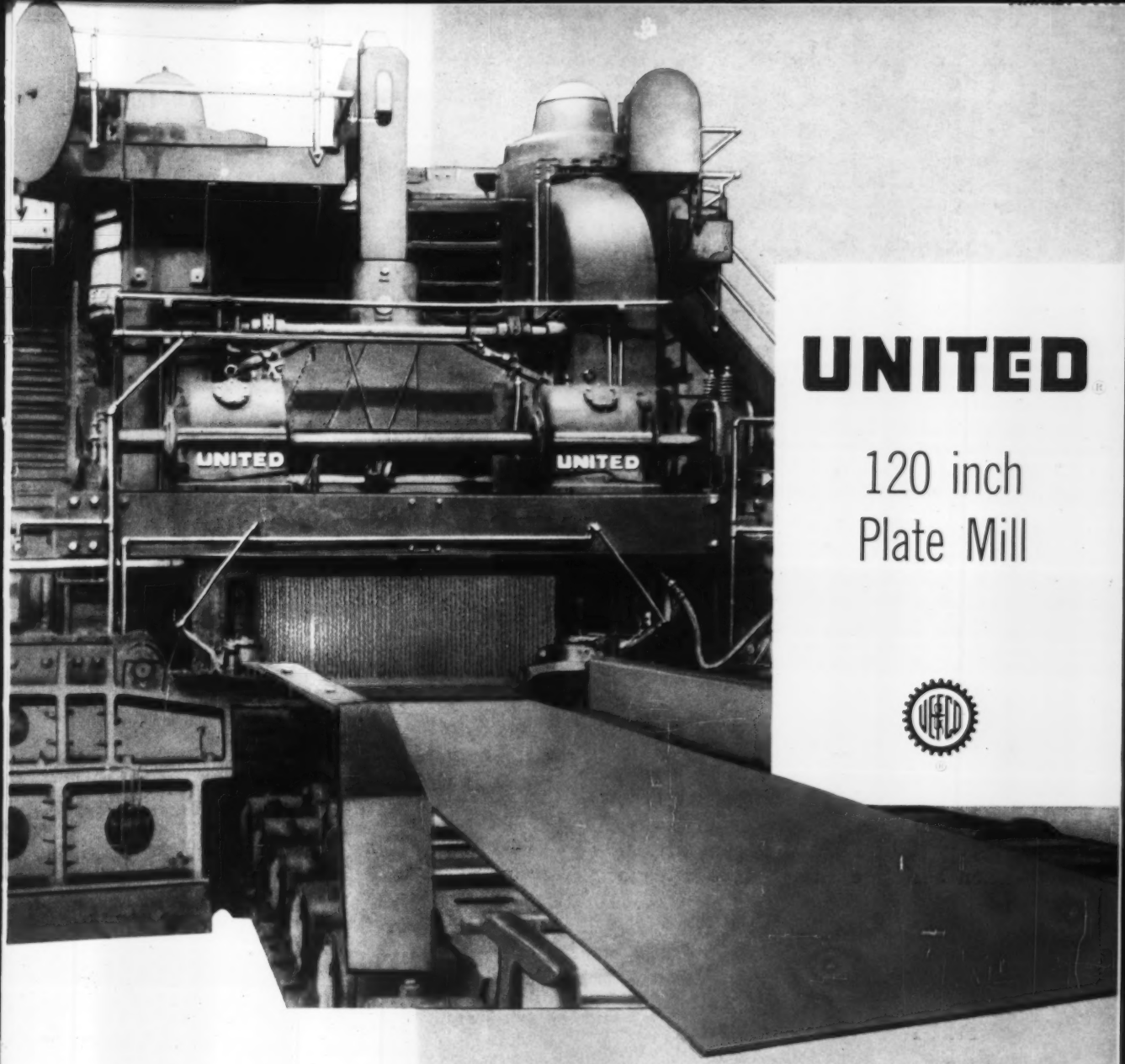
NEW BOOKS

The Calculation of Load and Torque in Hot Flat Rolling, P. M. Cook and A. W. McCrum, British Iron & Steel Research Association, 11 Park Lane, London W. 1, England. 109 pages, $9.30

This book contains the results of five years of work at the British Iron & Steel Research Association's Sheffield laboratories in determining stress-strain curves for steel in compression at temperatures up to 2192° F, and over a range of deformation speeds usually met in working practice. It describes the method and contains the data for calculating the load and torque for 12 steels. The 96 pages of large graphs give the necessary mean yield strength data for these steels at 1652, 1832, 2012, and 2192° F, over a range of strain rates and reductions covering all industrial requirements.

Product Directory of the Refractories Industry in the United States, 1958 Edition, Refractories Institute, First National Bank Bldg., Pittsburgh 22, Pa. $3.00 (plus 3 per cent sales tax in Pennsylvania)

This volume lists 2700 brands of refractories produced by 185 refractory manufacturers, representing almost 100 per cent coverage of the industry. It is cross-indexed by companies, plant locations, product divisions, and brand names.



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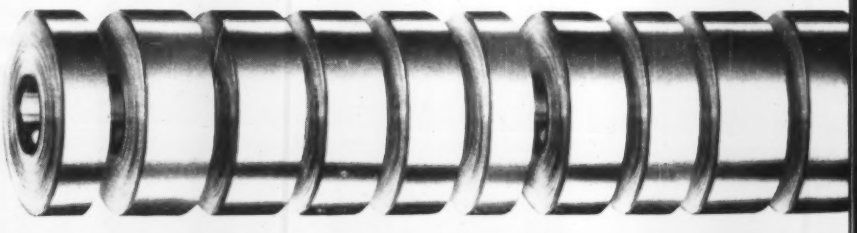

Market Outlook

Steady Improvement Seen for Steel

STEEL SHIPMENTS are slated for marked improvement next month. Leading producers forecast a gain of at least 20 per cent. Optimists won't be surprised if it's nearer one-third.

Barring an automotive strike, October will be a better month than September—probably the best of the year. Shipments will remain at a high level during November, declining only slightly at the yearend.

IMPACT ON STEELMAKING— If production rises as rapidly as shipments, operations will approach 75 per cent of capacity in September. Few producers expect such an upturn. Gradual improvement seems to be the style. Last week, furnaces were operated at 61 per cent of capacity, up half a point. Production was about 1,647,000 net tons of steel for ingots and castings.

AUGUST: SECOND BEST— Three factors have combined to make August's production (about 7 million tons) second only to June's: 1. Strong demand for construction products (reinforcing bars, wire mesh, galvanized sheets, standard pipe, plates, and structurals). 2. Increased buying for inventory replacement, especially by miscellaneous consumers. 3. Release of initial orders for steel to be used in new car production.

GROUND FOR OPTIMISM—Steel salesmen say their customers are more optimistic than they've been at any previous time this year. Most buyers seem convinced that the recession is fading. They're taking higher prices in stride, relieved that the air has been cleared and that markups were moderate. Steelmakers regard the August upturn as a clear indication of market strength.

AUTOMAKERS EYE REUTHER— Although they're in the market, automakers aren't releasing orders as rapidly as usual. (By mid-August, one mill had only 40 per cent of its anticipated October auto tonnage scheduled. A year ago it was fully booked.) Threatened by a UAW walkout, they're buying no more steel than necessary. Ordinarily, they'd consider current inventories (20 to 30 days) grossly inadequate. Instead of adding to their supplies, they're depending on three to five week delivery from the mills.

CONSUMERS EYE AUTOMAKERS— If and when the UAW contracts are signed, steel producers can expect a rash of orders—and not only from automakers. Other consumers have cut their inventories to the bone. Needing cash, they had no qualms about the practice as long as the carbuilders weren't buying. When the automakers release big orders, it will be unsafe for other users to gamble on quick deliveries.

APPLIANCE MAKERS BUY—"The pickup in retail sales of appliances has at least reduced the inventory of unsold finished goods which held up steel shipments during the first half," says a sheet sales executive. "Appliance sales began to improve in June, and now some of the big manufacturers are beginning to increase their orders."

PRODUCTION OUTLOOK— During the first eight months, U. S. steelmakers produced about 51 million net tons of steel for ingots and castings. June's output was tops: 7.13 million tons with operations at 61.7 per cent of capacity. If they're to turn out 82 million tons this year, they'll have to make 31 million during the next four months. They must average 7.75 million tons a month, operating at 66 per cent of capacity. Walter Reuther permitting, it's in the bag.

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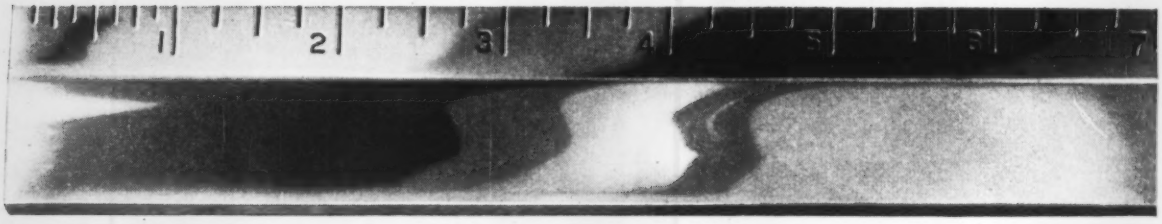

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Bristol Brass has offices and warehouses in Boston, Buffalo, Chicago, Cleveland, Dayton, Detroit, Milwaukee, New York, Philadelphia, Pittsburgh, Rochester, Syracuse.

Steel bar products being cooled after being reduced at 3000 ft per minute in Republic Steel Corp.'s new 11-in. "Bar Mill of Tomorrow" at South Chicago

Barmakers Look to Detroit

The decline in autos and machine tools cut production during the first half. But a steady farm industry plus new auto and road building equipment orders cheers producers

BARMAKERS are hoping that automotive orders will provide the needed impetus to get hot-rolled and cold-finished bars out of a slump during the second half.

Within the past month, concurrent with starts on 1959 model production, orders for those products from both automobile manufacturers and their suppliers have picked up substantially.

During the first half, bars suffered more than some other products. While hot-rolled sheets were off 37 per cent and cold-rolled sheets 27.6 per cent from 1957's first half, shipments of hot-rolled bars slipped 43.4 per cent and cold-finished bars 36.8 per cent.

Bar Proportion Drops—In the first half of 1956, shipments of hot-rolled bars were 10.6 per cent of total steel shipments. In 1957, they dropped to 9.8 per cent and they're down to 9 per cent this year. Cold-finished bars, which were 2.2 per cent of total shipments in the first half of 1956, have fallen to 1.7 per cent of the total in 1957 and 1958.

The more popular sizes can be had for early shipment, but certain sizes of bar flats are difficult to get in less than five to six weeks. Mills concentrate on the sizes in demand, rolling the less popular types when there are enough orders.

Orders Cheer Producers — Cold finishers now receiving orders for late August and September delivery are encouraged by fourth quarter delivery orders.

The farm equipment industry is the only market which has remained steady this year. Although not a large consumer tonnagewise, it expects 1958's sales volume to be 5 to 10 per cent ahead of 1957's. Virtually all important manufacturers in the industry have introduced new lines of tractors and implements.

After a dull first half, makers of road building machinery are expanding and buying more steel. Some are experiencing the best demand in their history.

Railroads Buy Little — Builders of freight cars used few bars this year due to the lack of railroad demand. The carriers may purchase more freely with government assistance. One prominent car-builder, however, feels increased carloadings, not government loans, will give railroads the needed lift. Poor business for machine tool and machinery builders this year has also hurt barmakers. Only mild improvement is seen in this market.

Large Inventories Hurt — Large customer inventories have also handicapped barmakers. According to a recent STEEL survey (Aug. 4, p. 121), some inventory reduction still is underway. About 46 per cent of the respondents reported 30 to 60 days' supply of hot-rolled carbon bars, and 52 per cent have that inventory of cold-finished bars. Little inventory building is expected.

First Half Totals—According to the American Iron & Steel Institute, producers shipped 2,585,059 tons of hot-rolled bars (including light shapes) in the first half of this year. In the corresponding period of 1957, they shipped 4,344,641

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punch press
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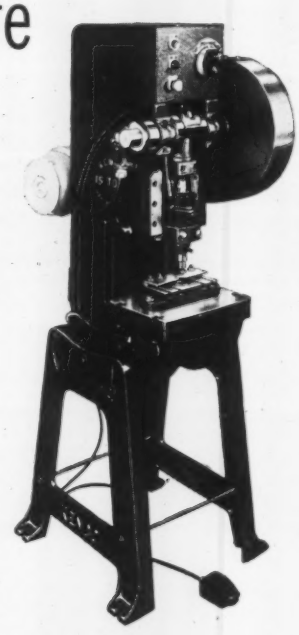

Single-trip control buttons are widely spaced, to keep hands clear of the danger zone. Operators must push *both* buttons at once... hold them until stroke reaches bottom, then release both buttons to start new cycle. Fail-safe operation. Impossible to "fudge." Impossible for press to double trip.

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tons, and in the first six months of 1956, 4,982,655 tons.

Shipments of cold-finished bars in the first half of 1958 totaled 472,460 tons, vs. 747,234 tons in the corresponding period of 1957, and 1,039,220 tons in 1956.

Who Buys Bars—Distribution of bars, as compiled by the AISI from 1956 and 1957 figures is as follows: Warehouses took 19 to 21 per cent; automotive, 17 to 19; construction, 10 to 13; machinery, 10 to 11; railroads, 5; and agriculture, 4 to 5 per cent.

Cold-finished bars are bought by: Warehouses, 24 to 27 per cent; automotive, 22 to 25; machinery, 23 to 24; agriculture, 4 to 5 per cent.

Fasteners Move Up

June and July pickups foretell rise in general manufacturing. Farm, construction business good

INDUSTRIAL FASTENERS are on the road to recovery.

The pickup began in mid-May, accelerated through June, and July sales were better than anticipated. (Basis: A survey by Harry O. McCully, senior vice president, Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.)

Bellwether Industry—A pickup in fastener orders precedes a general manufacturing upturn by about one month.

Inventory replacement is mainly responsible for the improvement, although some buying is for current needs, says Mr. McCully.

Second-half volume is expected to be at the June sales rate. This year's sales should be about 20 per cent below 1957's all-time high.

Auto Cut Hurts—The most severe setback in the first-half was the drop in sales to the auto industry. But August and September should see an increase in Detroit buying as the 1959 model year begins.

Farm equipment sales are running about 5 per cent ahead of last year's, the survey shows, but general industrial business is off about 15 per cent.

Bolts Big Item — Jobber orders picked up in June and July, and construction sales are holding at

1957's level. High strength bolts have been moving well. They're being used in more than 50 per cent of all heavy structures.

RB&W believes that by 1960 high strength bolts will be used in virtually all construction jobs.

Exports Down—Export markets are no longer important to U. S. fastener makers, says Mr. McCully; import competition has been a thorn in the industry's side for the last few months.

Special Metal Prices Rise

Allegheny Ludlum Steel Corp., Pittsburgh, increased the base price on most of its electrical alloy metals for magnetic and electronic applications. The revisions, averaging somewhat less than 3 per cent, were effective Aug. 15.

Items involved include: Bars, sheets, strips, and wire products made of the special metals as Mumetal, Moly Permalloy, Sealmet, Ohmaloy, Monimax, Sinimax, and Deltamax. The metals are used primarily as magnetic core materials and in glass-to-metal seal applications.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 128 & 129

Tempered spring steel strip joins the price march as a Worcester, Mass., producer ups prices $15 to $30 per ton depending on carbon range. Inventory reduction apparently has ended, and buying is mainly for current needs. This is not universal, as New England reports some inventory buying.

The auto industry is still placing good orders, but they are not buying so far ahead as usual and no stock building is noted.

Producers of stoves, sanitary ware, and commercial refrigeration equipment have stepped up orders, as have the appliance makers, but the increase is spotty. New York reports air conditioning needs are disappointing, and Chicago says appliance makers are of little help.

Tin plate and galvanized sheet production is close to capacity in the Chicago area and is holding up well in other sections due to grain bin, air-conditioning ductwork, and farm roofing and siding needs.

Galvanized production is expected to fall off soon as grain bin and seasonal requirements dwindle.

Low silicon sheets are in easy demand, reflecting not only a lull in demand for fractional horsepower motors, but also because some motormakers are using cold-rolled sheets to cut costs.

Sheet mill deliveries are getting longer. New York producers offer hot sheets in three weeks and cold sheets in one month.

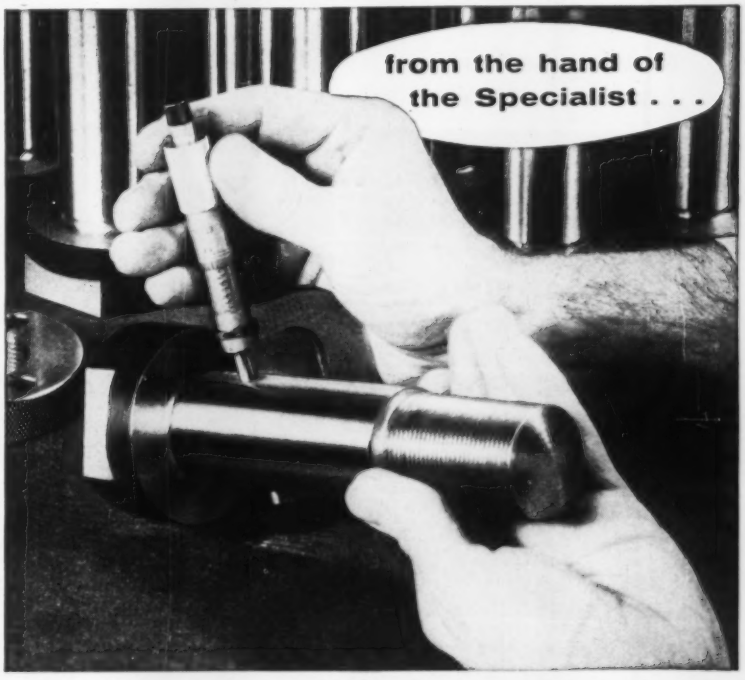
Inland Steel, Chicago, promises hot-rolled sheets in two to three weeks, with cold-rolled sheets unavailable until October.

Sheet producers in Pittsburgh expect the fourth quarter to be the best of the year, barring an auto strike. Production should peak in October or November, then decline slightly at the end of the year.

Stainless Steel . . .

Stainless Steel Prices, Page 133

Stainless steel orders are beginning to trickle in from auto plants, but releases are being delayed until Detroit has a clearer idea of when it will need the material. Most



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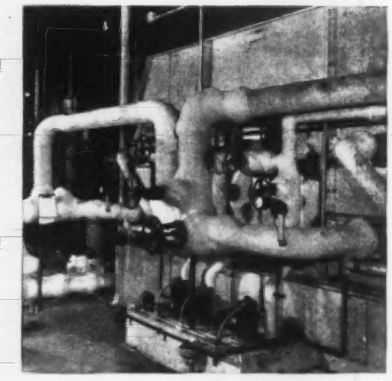

A typical case of using a Niagara Aero Heat Exchanger to provide cooling for production equipment shows amortization of this machine in 16 months and $90 per day revenue thereafter.

Industrial engineers with careful cost, upkeep and revenue records on all machines, credit Niagara Aero Heat Exchangers with important gains over other methods.

They use these machines to provide cooling for production equipment, welders, extruders, drawing dies, furnaces, quench baths, plating, chemical and electronic process...all millwater system uses.

They get positive control of critical process temperatures with improved product quality, rejection losses prevented. Heat is removed at the rate of in-put.

A closed system, dirt free prevents all troubles from bad water; transferring heat to the atmosphere by the evaporation of a very small amount of water solves all problems of water supply or disposal.

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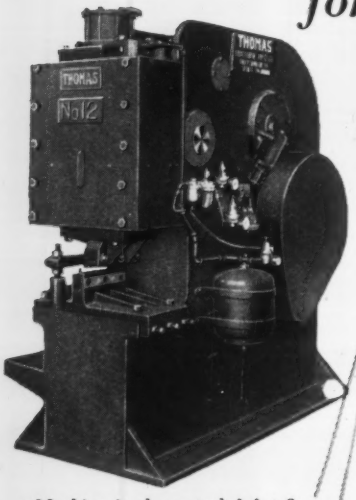

This all-steel Thomas machine is available in capacities of 50 through 600 tons. It can be supplied with tools for shearing flats, rounds or angles, or fitted with punching tools.

• *Machine is shown tooled for flats. Modern Thomas design makes this machine a compact, space-saving, self-contained unit for shearing or punching.*

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54

of it is for trim and can be delayed a little in shipment.

Auto suppliers are placing more orders for stainless alloys. They are scheduling deliveries for September —in time to get out their components for 1959 models.

Tool Steel . . .

Tool Steel Prices, Page 133

"August shipments won't match those of June or July, when many of our customers were hedging," says a tool steel producer in Pittsburgh. "But they'll be sufficient to give us our third best month. Inventories have been pretty well depleted. We talked to some people at the ASTE show in Philadelphia who told us they have been taking oversize forgings and machining them down to save money. That might save money, but it doesn't save tool steel.

"There's little likelihood of a dramatic pickup in the near future. Missiles and rockets don't require as much steel as jet engines and airframes. The automotive people won't come back into the market until November or December, when they start tooling for the 1960 models."

Tin Plate . . .

Tin Plate Prices, Page 129

U. S. Steel Corp.'s Columbia-Geneva Steel Div., San Francisco, has awarded contracts for a major addition to its tin plate manufacturing facilities in Pittsburg, Calif., which will include a new continuous annealing line.

Brewers Use More Steel

The brewing industry is second only to fruit and vegetable canners as a user of metal containers. It accounted for almost 1.6 billion lb of steel and tin consumed in 1957 to make 8.2 billion cans, an industry record, says the United States Brewers Foundation, New York.

Can production for brewers last year was 249 million units greater than in 1956. The 791,507 tons of tin plate needed for beer and ale cans was 24,000 tons more than in 1956.

In 1957, about 24.5 million barrels of malt beverages were packaged in cans, representing 36.8 per

cent of all packaged sales and an increase of 1.2 per cent over 1956. By contrast, in 1949 only 18.8 per cent of packaged beer was sold in cans.

Tubular Goods . . .

Tubular Goods Prices, Page 133

All leading producers have followed Babcock & Wilcox Co., New York, in raising prices for seamless carbon and alloy, mechanical and pressure tubing. Increases average 3.5 per cent and reflect advances in costs of raw materials and labor.

Commission in direct steel pipe shipments through distributors has been reduced to 3 per cent from 5 per cent.

Demand for tubing looks better, particularly for automotive and appliance use. Oil country orders are still fairly quiet but are expected to increase next month.

Steel Bars . . .

Bar Prices, Page 127

Booking of bar orders has improved a trifle and is fairly diversified. Demand for hot-rolled carbon bars has increased, compared with the volume in July when it dipped to the lowest point so far this year. Large rounds and flats are among the more popular items. The over-all situation is sluggish.

Fastener requirements are a shade better, reflecting some gain in purchases by the automotive and construction industries. Railroad demand for bars remains slow and there is little, if any, improvement in specifications from cold drawers and distributors.

A purchasing agent in Detroit says he's ordering now for October delivery. The tonnages involved are 30 per cent larger than those placed last month, he adds.

A file manufacturer at Providence, R. I., a leading consumer of high carbon flats, is closing its manufacturing operations there and will transfer them to branch plants.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 127

Importers of reinforcing bars and wire are in the driver's seat in most coastal areas. During the last three months, for instance, 40,000 tons of reinforcing material have been imported into the Houston area. Only about 7000 tons were open

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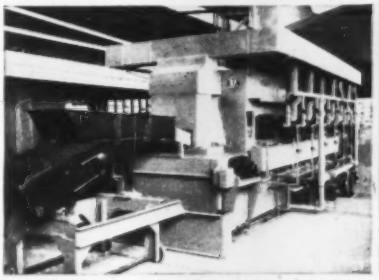
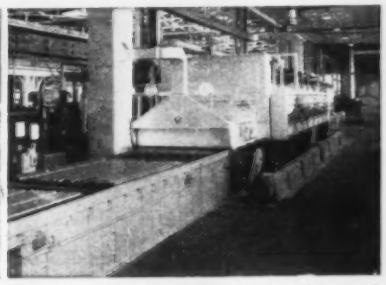
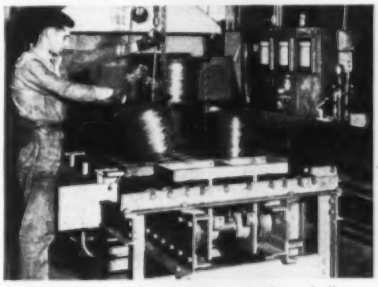


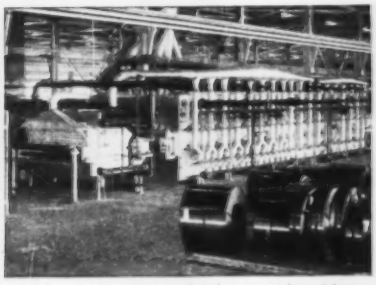
EF gas fired radiant tube combination hardening and dry cyaniding furnace with automatic feeder that distributes parts evenly on conveyor; and a dual oil, water quench.



Tubing, strip, rod and wire in coils, strands or on reels are being uniformly processed in hundreds of EF continuous and batch type furnace installations.



Charging end of EF special atmosphere bulkhead pusher furnace; bright anneals copper and copperweld wire and clean anneals brass wire. Capacity 4000 lbs. per hour.



EF gas fired unit—bright anneals wide or narrow strip in single or multiple strands. Other continuous and batch types for ferrous or non-ferrous, including stainless.

Reflecting more than 40 years of continuous research and experience, and thousands of successful gas fired, oil fired and electric installations, EF engineers are in position to design, build and install the exact size and type of equipment you need for any product, any hourly output and any heat treating or heat processing requirement. Furnished complete with special atmosphere equipment and material handling facilities, synchronized and coordinated with your production schedules.

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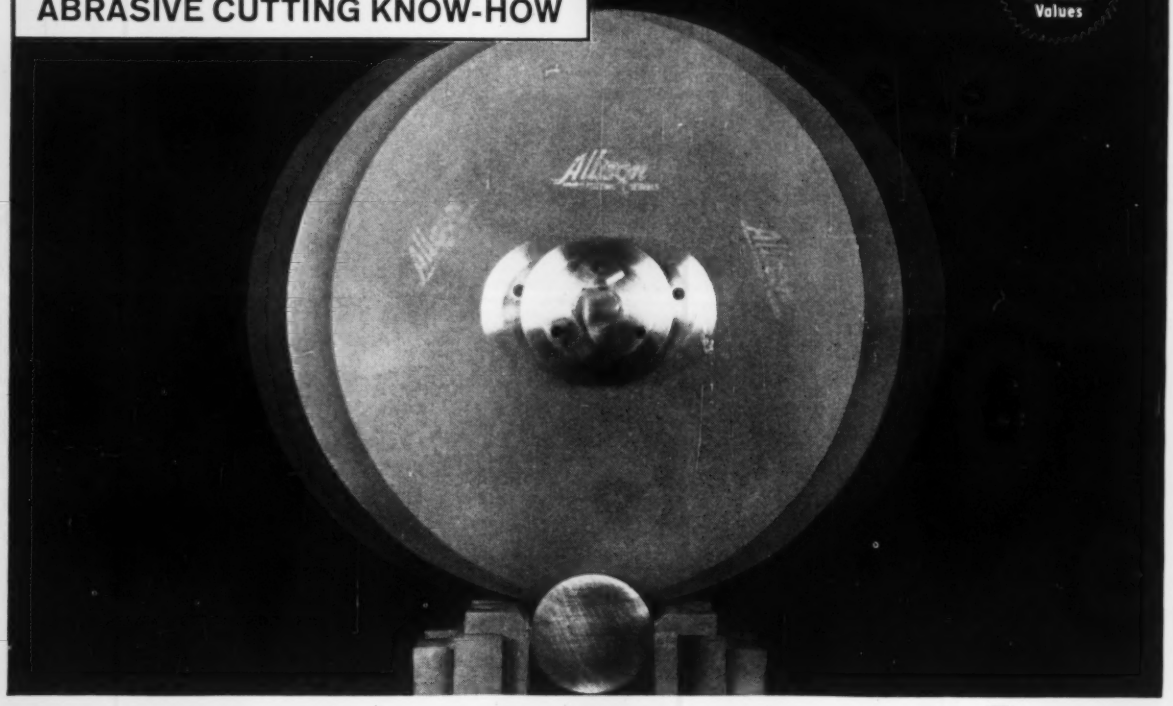

Oscillation Improves Abrasive Cutting 4 Ways

On an oscillating-type abrasive cut-off machine, the cutting wheel is rocked back and forth *across* the cut while the wheel is fed downward. This horizontal movement produces some remarkable results.

1 **Greater cutting capacity** is one big advantage of oscillation. Because oscillation reduces the arc of contact between the wheel and the work, it is possible to cut solid steel bars up to 12″ square. Without oscillation, 2″ to 3″ would be the practicable limit.

2 **Faster cutting** is another benefit of oscillation. Because the reduced arc of contact offers less resistance to the cutting wheel on large sections, the same wheel cuts faster, straighter, and with less feed pressure. Cutting rates of 4 to 8 seconds per square inch are maintained on even the largest cross-sections.

3 **Better quality cuts** are obtained with oscillation. Less heat is generated because of the small arc of contact, and the rocking action permits coolant to enter the cut more easily and prevent any heat build-up.

Burn-free cuts are produced with negligible burr, and there is little or no need for further finishing.

4 **Longer wheel life** is an important economy factor. The lower cutting temperature resulting from oscillation adds extra cuts to the life of every wheel. The better flow of coolant within the cut washes away metal chips and loose abrasive, helping wheel efficiency.

HOW ALLISON-CAMPBELL CAN HELP

A complete selection of machines and wheels for *any* cut-off application is offered by ALLISON-CAMPBELL. Four types of CAMPBELL machines—chop stroke, oscillating, horizontal, and rotary—in capacities from the smallest stock to 14″ rounds . . . billets up to 12″ square . . . plate up to 6″ thick and 20 ft. long. ALLISON wheels—more than 150 different specifications—rubber or resinoid bond—3″ to 34″ diameters—.006″ to 3/16″ thick.

Expert recommendations from your ALLISON-CAMPBELL Field Engineer can solve your cut-off problems for you. He'll be glad to show you how to get the faster, cleaner cuts you can expect from modern abrasive cutting techniques. Ask him.

WRITE FOR NEW BULLETIN

• Individual analysis of your cutting problems can be made in the new ALLISON-CAMPBELL Demonstration Laboratory. Write for a copy of DH-20, a new bulletin which describes how you can use these facilities. Complete details on ALLISON wheels and CAMPBELL machines are also available.

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hearth grades and eligible for use in Texas Highway Department projects. Bessemer steel cannot be used in such projects in that state. Imported bars are being barged to Kansas City, Mo.

Some importers in the Southwest were out of the market for reinforcing bars during last week, indicating that foreign prices may be increased soon. Imports are $25 to $32 a ton under domestic bar prices.

Plates . . .

Plate Prices, Page 127

An expected gain in plate demand hasn't materialized yet, although some southern and western areas report that sales continue to be firm. A leading Seattle plate fabricator has a "much improved outlook" based on inquiries and new contracts. Other users in that area say industrial construction and military jobs in Alaska are bolstering requirements for plates. Also on the rise is demand for plates for oil country goods and storage.

In other areas, plate buying is spotty and generally disappointing to sellers, many of whom predicted an upswing in sales at the end of this month. Construction needs are declining, tank requirements are low, and sales to railroad equipment builders continue slow.

In the New York area, shipwork continues steady. Structural fabricators have fairly large plate requirements, and there's a pickup in demand from pipe fabricators.

Wire . . .

Wire Prices, Pages 129 & 130

Moderate improvement in wire bookings continues. Finishing operations in New England are 10 to 15 per cent over those in the first half. Automotive orders are heavier and for prompt shipment; consumers in this category are not buying beyond 30 days.

Consumption is also higher. Low inventories in many cases force users to resort to fill-in replacement orders.

Included are upholstery wire for coils, fasteners, and springs.

Increases in wire prices are substantially higher than general steel average, and consumers in many cases are concerned about their ability to pass on the advances—notably those confronted with sharp competition for finished products.

Demand for spring wire is steady and about the same as it was last year, says a drawer in the Detroit area. He adds that reinforcing wire for highway construction is slowing down as builders prepare for the normal seasonal letup in activity. Orders are being processed for September and October delivery, but the mills believe there will be a definite slowdown in orders in the fourth quarter.

Manufacturers of fine and weaving wire are advancing prices $14 a ton. Cold-rolled flat wire prices are being increased a like amount while MB spring high-carbon wire is being advanced $9 a ton.

Distributors . . .

Prices, Page 134

Distributors are advancing prices, adjusted to new quantity extras and deductions on most hot-rolled carbon products.

Demand continues sluggish. There's only token resistance to price changes in areas where distributors raised prices. In other sections, where prices have not been altered in the wake of mill price hikes, prospects of higher prices are not stimulating demand noticeably.

August has brought only moderate improvement following a disappointing July. Vacations and automotive shutdowns have kept sales low. Most steel service centers are optimistic about the possibility of an upswing in September

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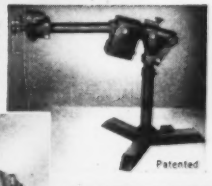

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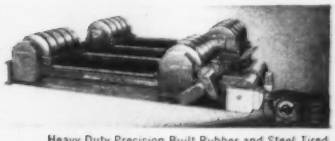

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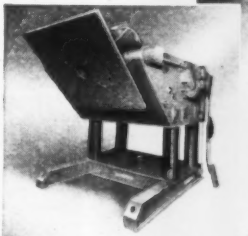
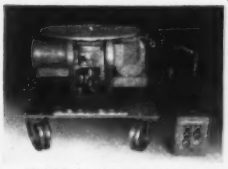
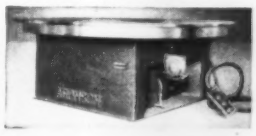


Fully Automatic Gear Driven Positioners, featuring Geared Elevation, 135° Tilting and Variable or Constant Speed Rotation. Capacities to 350,000 lbs.



Model D Gear Driven Positioners. Compact, Precise, Rugged. Capacities to 1000 lbs.

Rugged Head and Tail Stock for positioning bulky weldments between centers. Table Backup for Zero Deflection. Magnetic Braking. Capacities to 160,000 lbs. Geared Elevation Optional.



Heavy Duty Floor Turntables with precision speed control and Magnetic Braking, used for welding, burning, X-raying, etc. Capacities to 120,000 lbs., various heights and speeds.

Bench Turntable Automatic Positioners with Mercury Grounding. Capacities to 500 lbs.

Quality POSITIONERS by **Aronson MACHINE COMPANY**
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orders, although the average tonnage per order is still slight.

Construction is a strong factor in several areas. Distributors in Houston have booked some sizable orders for merchant bars and structural shapes. Those orders are reflected in larger orders placed by distributors with mills.

Distributors in New England say their volume is affected by booking of small orders by mills, in some cases 4000 to 6000 lb; such orders include high extras but are still priced under warehouse lists.

Semifinished Steel . . .

Semifinished Prices, Page 127

U. S. Steel Corp. is beginning work on a three-step program to rehabilitate the main electrical system of its McDonald Works, Youngstown. Increased mill production since the works were built more than 40 years ago has put a heavy burden on the power system. The new system will increase production by eliminating downtime and plant equipment failures, says Laurin Woodworth, general superintendent.

One of the steel industry's most historic steam engines is about to be retired. Electric power will replace the engine, which drives a blooming mill at Youngstown Sheet & Tube Co.'s Brier Hill Works, Youngstown. Efficiency will be improved and output speeded. The steam engine was one of two built by William Tod Co. (now part of United Engineering & Foundry Co.) in 1913. The other unit was built for Japan. The entire Brier Hill Works, which produces steel mainly for seamless pipe, will be shut down for over two weeks during the changeover.

Steel production is expected to reach the year's low in the San Francisco area during the third quarter. Thereafter, steady improvement is expected as the result of acceleration in defense spending and public works and highway programs.

Big Building Started

The first pieces of structural steel for the largest building to be erected anywhere in nearly 30 years (the Chase Manhattan Bank, New York) have been set in place. It'll require about 50,000 tons of steel—second only to the amount that went into the Empire State Building.

A grillage section, which will be the base for the large columns, was the first unit installed. It's on a concrete foundation 100 ft below street level.

Structural Shapes . . .

Structural Shape Prices, Page 127

Structural fabricating shops are having a rugged time now, paying higher prices for plain material and quoting lower prices for their products as the result of intense competition.

In New England, competition for school tonnage is such that some shops are refusing to quote. Practically all structural fabricating firms are bidding on bridgework, heightening the competition.

Although the building industry is booming, in comparison with other metalworking industries, backlogs are declining. Fabricated structural steel bookings are about 25 per cent under 1957.

Yuba Consolidated Industries Inc., San Francisco, will close its Richmond, Calif., Calsteel Div. Sept. 30. Calsteel's structural steel business will be merged with Yuba's Judson Pacific-Murphy Div. in Emeryville, while Yuba Mfg. Div. in Benecia, near Richmond, will absorb Calsteel's hydroelectric work.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

1155 tons, Darling Apartments, Wilmington, Del., through Ernest Di Sabatino & Sons, to Belmont Iron Works, Eddystone, Pa. It was recently reported (erroneously) that the project was placed with another fabricator.

880 tons, 587-ft deck plate girder bridge and approaches, Canterbury-Boscawen, N. H., to Bethlehem Steel Co., Bethlehem, Pa.; Halloran Construction Co., Providence, R. I., general contractor.

530 tons, six state highway bridges, Wilmington-Tewksbury-Andover, Mass., to A. O. Wilson Structural Co., Cambridge, Mass.; Bayer & Mingolla Construction Co., Worcester, Mass., general contractor.

350 tons, science building, Holy Cross College, Worcester, Mass., to A. O. Wilson Structural Co., Cambridge, Mass.; Granger Construction Co., Worcester, general contractor.

300 tons, regional high school, Whitman-Hanson, Mass., to Bethlehem Steel Co., Bethlehem, Pa.; Tocci Bros. Construction Co. Inc., Newton, Mass., general contractor; 40 tons, reinforcing bars, Northern Steel Inc., Boston.

250 tons, power shop, Ice Harbor project; bids to U. S. Engineer, Walla Walla, Wash., Sept. 18.

150 tons, Army hangar, Ft. Lewis, Wash., to Fought & Co., Portland, Oreg.; Earley Construction Co., Tacoma, Wash., general contractor.

140 tons, administration building, Brandeis University, Waltham, Mass., to A. O. Wilson Structural Co., Cambridge, Mass.; Morris & Son Construction Co., Lowell, Mass., general contractor; concrete reinforcing bars, Bethlehem Steel Co., Bethlehem, Pa.

130 tons, warehouse, Franklin Research Insti-

(Please turn to Page 137)

DISTRICT INGOT RATES

(Percentage of Capacity Engaged)

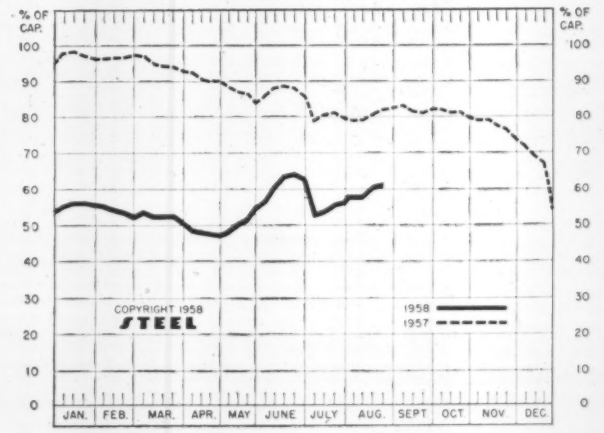
	Week Ended Aug. 24	Change	Same Week 1957	Same Week 1956
Pittsburgh	52.5	0*	81.5	96
Chicago	73	+ 4*	86.5	97.5
Eastern	61	+ 1	88	96
Youngstown	49	— 4	79	95
Wheeling	80	+ 6	85	95
Cleveland	53.5	+ 0.5*	89.5	100
Buffalo	47	— 4.5	95	102.5
Birmingham	52	— 1.5	85.5	85
Cincinnati	72.5	+ 0.5*	85	85.5
St. Louis	77	+ 2.5	79.5	92
Detroit	69.5	+ 1*	84	90
Western	71	+ 1	97	89
National Rate	61	+ 0.5	82	95.5

INGOT PRODUCTION‡

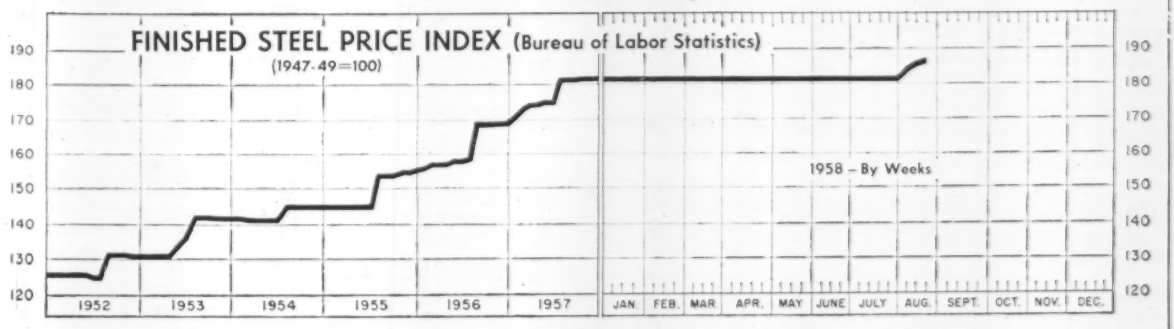
	Week Ended Aug. 24	Week Ago	Month Ago	Year Ago
INDEX (1947-49=100)	104.5†	101.6	96.2	130.8
NET TONS (In thousands)	1,678†	1,632	1,546	2,101

*Change from preceding week's revised rate. †Estimated. ‡American Iron & Steel Institute. Weekly capacity (net tons): 2,699,173 in 1958; 2,559,490 in 1957; 2,461,893 in 1956.

NATIONAL STEELWORKS OPERATIONS



Price Indexes and Composites



Aug. 19, 1958	Week Ago	Month Ago	July Avg	Year Ago
186.2	186.2	181.5	181.5	181.5

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Aug. 19

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard No. 1	$5.660	Bars, Reinforcing	6.335
Rails, Light, 40 lb	7.067	Bars, C.F., Carbon	10.710
Tie Plates	6.600	Bars, C.F., Alloy	14.125
Axles, Railway	10.175	Bars, C.F., Stainless, 302 (lb)	0.553
Wheels, Freight Car, 33 in. (per wheel)	60.000	Sheets, H.R., Carbon	6.350
Plates, Carbon	6.350	Sheets, C.R., Carbon	7.300
Structural Shapes	6.167	Sheets, Galvanized	8.545
Bars, Tool Steel, Carbon (lb)	0.560	Sheets, C.R., Stainless, 302 (lb)	0.688
Bars, Tool Steel, Alloy, Oil Hardening Die (lb)	0.680	Sheets, Electrical	12.625
Bars, Tool Steel, H.R., Alloy, High Speed, W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.060 (lb)	1.400	Strip, C.R., Carbon	9.489
Bars, Tool Steel, H.R., Alloy, High Speed, W18, Cr 4, V 1 (lb)	1.895	Strip, C.R., Stainless, 430 (lb)	0.493
Bars, H.R., Alloy	10.775	Strip, H.R., Carbon	6.250
Bars, H.R., Stainless, 303 (lb)	0.525	Pipe, Black, Buttweld (100 ft)	20.525
Bars, H.R., Carbon	6.675	Pipe, Galv., Buttweld (100 ft)	23.975
		Pipe, Line (100 ft)	205.710
		Casing, Oil Well, Carbon (100 ft)	201.080
		Casing, Oil Well, Alloy (100 ft)	315.213
Tubes, Boiler (100 ft)	49.593	Black Plate, Canmaking Quality (95 lb base box)	7.583
Tubing, Mechanical, Carbon (100 ft)	25.270	Wire, Drawn, Carbon	10.575
Tubing, Mechanical, Stainless, 304 (100 ft)	205.608	Wire, Drawn, Stainless, 430 (lb)	0.653
Tin Plate, Hot-dipped, 1.25 lb (95 lb base box)	9.783	Bale Ties (bundles)	7.967
Tin Plate, Electrolytic, 0.25 lb (95 lb base box)	8.483	Nails, Wire, 8d Common	9.828
		Wire, Barbed (80-rod spool)	8.719
		Woven Wire Fence (20-rod roll)	21.737

STEEL's FINISHED STEEL PRICE INDEX*

	Aug. 20 1958	Week Ago	Month Ago	Year Ago	5 Yr Ago
Index (1935-39 avg=100)	246.65	246.65	239.15	239.15	189.38
Index in cents per lb	6.682	6.682	6.479	6.479	5.130

STEEL's ARITHMETICAL PRICE COMPOSITES*

Finished Steel, NT	$149.28	$149.28	$145.42	$146.19	$115.56
No. 2 Fdry Pig Iron, GT	66.49	66.49	66.49	66.49	56.54
Basic Pig Iron, GT	65.99	65.99	65.99	65.99	56.04
Malleable Pig Iron, GT	67.27	67.27	67.27	67.27	57.27
Steelmaking Scrap, GT	41.33	41.33	37.67	53.50	43.17

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	Aug. 20 1958	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bars, H.R., Pittsburgh	5.675	5.675	5.425	5.425	4.15
Bars, H.R., Chicago	5.675	5.675	5.425	5.425	4.15
Bars, H.R., deld. Philadelphia	5.975	5.975	5.725	5.715	5.302
Bars, C.F., Pittsburgh	7.65*	7.65*	7.30*	7.30*	5.20
Shapes, Std., Pittsburgh	5.50	5.50	5.275	5.275	4.10
Shapes, Std., Chicago	5.50	5.50	5.275	5.275	4.10
Shapes, deld., Philadelphia	5.77	5.77	5.545	5.585	4.38
Plates, Pittsburgh	5.30	5.30	5.10	5.10	4.10
Plates, Chicago	5.30	5.30	5.10	5.10	4.10
Plates, Coatesville, Pa.	5.30	5.30	5.10	5.50	4.35
Plates, Sparrows Point, Md.	5.30	5.30	5.10	5.10	4.10
Plates, Claymont, Del.	5.30	5.30	5.10	5.70	4.55
Sheets, H.R., Pittsburgh	5.10	5.10	4.925	4.925	3.925
Sheets, H.R., Chicago	5.10	5.10	4.925	4.925	3.925
Sheets, C.R., Pittsburgh	6.275	6.275	6.05	6.05	4.775
Sheets, C.R., Chicago	6.275	6.275	6.05	6.05	4.775
Sheets, C.R., Detroit	6.275	6.275	6.05	6.05-6.15	4.975
Sheets, Galv., Pittsburgh	6.875	6.875	6.60	6.60	5.275
Strip, H.R., Pittsburgh	5.10	5.10	4.925	4.925	3.975-4.425
Strip, H.R., Chicago	5.10	5.10	4.925	4.925	3.925
Strip, C.R., Pittsburgh	7.425	7.425	7.15	7.15	5.45-5.95
Strip, C.R., Chicago	7.425	7.425	7.15	7.15	5.70
Strip, C.R., Detroit	7.425	7.425	7.15	7.25	5.45-6.05
Wire, Basic, Pittsburgh	8.00	8.00	7.65	7.65	5.475-5.525
Nails, Wire, Pittsburgh	8.95	8.95	8.95	8.95	6.35-6.55
Tin plate (1.50 lb) box, Pitts.	$10.30	$10.30	$10.30	$10.30	$8.95

*Including 0.35c for special quality.

SEMIFINISHED STEEL					
Billets, forging, Pitts. (NT)	$99.50	$99.50	$96.00	$96.00	$75.50
Wire rods 7/32-9/16" Pitts.	6.40	6.40	6.15	6.15	4.525

PIG IRON, Gross Ton	Aug. 20 1958	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bessemer, Pitts.	$67.00	$67.00	$67.00	$67.00	$57.00
Basic, Valley	66.00	66.00	66.00	66.00	56.00
Basic, deld., Phila.	70.41	70.41	70.41	69.88	60.75
No. 2 Fdry, Neville Island, Pa.	66.50	66.50	66.50	66.50	56.50
No. 2 Fdry, Chicago	66.50	66.50	66.50	66.50	56.50
No. 2 Fdry, deld., Phila.	70.91	70.91	70.91	70.38	61.25
No. 2 Fdry, Birm.	62.50	62.50	62.50	62.50	52.88
No. 2 Fdry (Birm.) deld. Cin	70.20	70.20	70.20	70.20	60.43
Malleable, Valley	66.50	66.50	66.50	66.50	56.50
Malleable, Chicago	66.50	66.50	66.50	66.50	56.50
Ferromanganese, net ton	245.00†	245.00†	245.00†	255.00†	200.00*

†74-76% Mn, Duquesne, Pa. *Etna, Pa.

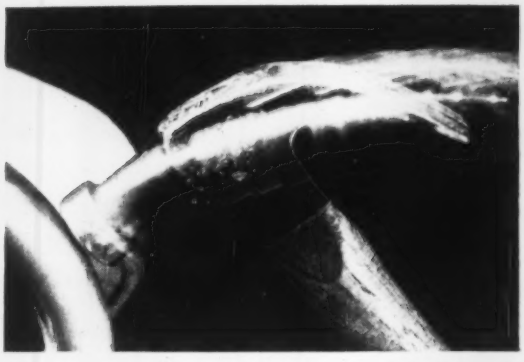
SCRAP, Gross Ton (Including broker's commission)					
No. 1 Heavy Melt, Pittsburgh	$42.50	$42.50	$37.50	$55.50	$45.50
No. 1 Heavy Melt, E. Pa.	38.00	38.00	35.00	52.00	42.50
No. 1 Heavy Melt, Chicago	43.50	43.50	40.50	53.00	41.50
No. 1 Heavy Melt, Valley	43.50	43.50	41.50	55.50	45.50
No. 1 Heavy Melt, Cleve.	40.00	40.00	38.50	52.50	44.50
No. 1 Heavy Melt, Buffalo	34.50	34.50	27.50	49.50	43.75
Rails, Rerolling, Chicago	64.50	64.50	61.50	74.50	56.00
No. 1 Cast, Chicago	45.50	45.50	44.50	46.50	42.00

COKE, Net Ton					
Beehive, Furn., Connlsvl.	$15.25	$15.25	$15.25	$15.25	$14.75
Beehive, Fdry., Connlsvl.	18.25	18.25	18.25	18.25	16.75

Welding reduces bridge costs

Calvert Iron Works, a leading bridge builder in the Southeast, reports reducing construction costs by using arc welding instead of riveting. New techniques and improved electrodes have made welding a practical and more economical means for fabrication.

New M&T "Murex" electrodes help make the difference. Calvert considers them best for their work, reducing welding time and practically eliminating X-ray rejects. Information about these and more than 1000 other types and sizes of Murex electrodes are given in catalog ESC, available on request.



Vinyl coating stands rough abuse

Products coated with Unichrome Plastisol can be dropped, bumped, exposed to acids, alkalies and other corrosives — all without damage to the finsh.

Unichrome Plastisols are vinyl compounds that form a tough, seamless, resilient, protective thick skin. Coating won't chip, crack, tear, peel, scuff or blister; can be applied to products of bakeable size by spray, dip and other methods. Send for Bulletin VP-3.

It costs little to guard working parts

To millions everywhere, SINGER stands for quality in sewing machines. One doesn't "toy" with such a reputation. So, daughter's machine gets many of the fine construction details found in mother's. Working parts for both get extra resistance to wear and corrosion with Unichrome SRHS® Chromium plating.

Literally hundreds of thousands of small parts are quality finished each day at minimum cost — a feat made feasible because of the self-regulated high speed operation of the bath; and the Unichrome Chromium Plating Barrel, the first successful production equipment of its type. Send for data on both.

METAL & THERMIT 1908 1958 50TH YEAR

METAL & THERMIT CORPORATION

GENERAL OFFICES: RAHWAY, NEW JERSEY

Pittsburgh • Atlanta • Detroit • E. Chicago, Los Angeles

In Canada: Metal & Thermit — United Chromium of Canada, Limited, Rexdale, Ont.

Steel Prices

Mill prices as reported to STEEL, Aug 20, cents per pound except as otherwise noted. *Changes shown in italics.* Code number following mill points indicates producing company. Key to producers, page 128; footnotes, page 130.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)

Munhall,Pa. U5 ..... $73.50

INGOTS, Alloy (NT)

Detroit S41 ..... $77.00
Farrell,Pa. S3 ..... 82.00
Lowellville,O. S3 ..... 82.00
Midland,Pa. C18 ..... 82.00
Munhall,Pa. U5 ..... 82.00
Sharon,Pa. S3 ..... 82.00

BILLETS, BLOOMS & SLABS
Carbon, Rerolling (NT)

Bessemer,Pa. U5 ..... $80.00
Buffalo R2 ..... 80.00
Clairton,Pa. U5 ..... 80.00
Ensley,Ala. T2 ..... 80.00
Fairfield,Ala. T2 ..... 80.00
Fontana,Calif. K1 ..... 90.50
Gary,Ind. U5 ..... 80.00
Johnstown,Pa. B3 ..... 80.00
Lackawanna,N.Y. B2 .. 80.00
Munhall,Pa. U5 ..... 80.00
Owensboro,Ky. G8 ..... 77.50
S.Chicago,Ill. R2, U5 .. 80.00
S.Duquesne,Pa. U5 .... 80.00
Sterling,Ill. N15 ..... 77.50
Youngstown R2 ..... 80.00

Carbon, Forging (NT)

Bessemer,Pa. N5 ..... $99.50
Buffalo R2 ..... 99.50
Canton,O. R2 ..... 102.00
Clairton,Pa. U5 ..... 99.50
Conshohocken,Pa. A3 .. 104.50
Ensley,Ala. T2 ..... 99.50
Fairfield,Ala. T2 ..... 99.50
Farrell,Pa. S3 ..... 99.50
Fontana,Calif. K1 ..... 109.00
Gary,Ind. U5 ..... 99.50
Geneva,Utah C11 ..... 99.50
Houston S5 ..... 104.50
Johnstown,Pa. B2 ..... 99.50
Lackawanna,N.Y. B2 .. 99.50
LosAngeles B3 ..... 105.50
Midland,Pa. C18 ..... 99.50
Munhall,Pa. U5 ..... 99.50
Owensboro,Ky. C8 ..... 96.00
Seattle B3 ..... 109.50
Sharon,Pa. S3 ..... 99.50
S.Chicago R2, U5, W14 .. 99.50
S.Duquesne,Pa. U5 .... 99.50
S.SanFrancisco B3 .... 105.50
Warren,O. C17 ..... 99.50

Alloy, Forging (NT)

Bethlehem,Pa. R2 .... $119.00
Bridgeport,Conn. C32 ..... 119.00
Buffalo R2 ..... 119.00
Canton,O. R2, T7 .... 119.00
Conshohocken,Pa. A3 .. 121.00
Detroit S41 ..... 114.00
Economy,Pa. B14 .... 114.00
Farrell,Pa. S3 ..... 119.00
Fontana,Calif. K1 .... 140.00
Gary,Ind. U5 ..... 119.00
Houston S5 ..... 124.00
Ind.Harbor,Ind. Y1 .... 119.00
Johnstown,Pa. B2 .... 119.00
Lackawanna,N.Y. B2 .. 119.00
LosAngeles B3 ..... 134.00
Lowellville,O. S3 ..... 119.00
Massillon,O. R2 ..... 119.00
Midland,Pa. C18 ..... 119.00
Munhall,Pa. U5 ..... 119.00
Owensboro,Ky. G8 .... 114.00
Sharon,Pa. S3 ..... 119.00
S.Chicago R2,U5,W14 .. 119.00
S.Duquesne,Pa. U5 .... 119.00
Struthers,O. Y1 ..... 119.00
Warren,O. C17 ..... 119.00

ROUNDS, SEAMLESS TUBE (NT)

Buffalo R2 ..... $122.50
Canton,O. R2 ..... 125.00
Cleveland R2 ..... 122.50
Gary,Ind. U5 ..... 122.50
S.Chicago,Ill. R2, W14 122.50
S.Duquesne,Pa. U5 .... 122.50
Warren,O. C17 ..... 122.50

SKELP

Aliquippa,Pa. J5 ..... 5.05
Munhall,Pa. U5 ..... 5.05
Pittsburgh J5 ..... 5.05
Warren,O. R2 ..... 5.05
Youngstown R2, U5 .... 5.05

WIRE RODS

AlabamaCity,Ala. R2 .. 6.40
Aliquippa,Pa. J5 ..... 6.40
Alton,Ill. L1 ..... 6.60
Buffalo W12 ..... 6.40
Cleveland A7 ..... 6.40
Donora,Pa. A7 ..... 6.40
Fairfield,Ala. T2 ..... 6.40
Houston S5 ..... 6.65
IndianaHarbor,Ind. Y1 .. 6.40
Johnstown,Pa. B2 ..... 6.40
Joliet,Ill. A7 ..... 6.40
KansasCity,Mo. S5 .... 6.65
Kokomo,Ind. C16 ..... 6.50
LosAngeles B3 ..... 6.95
Minnequa,Colo. C10 .... 6.65
Monessen,Pa. P7 ..... 6.40
N.Tonawanda,N.Y. B11 .. 6.40
Pittsburg,Calif. C11 .... 7.20
Portsmouth,O. P12 .... 6.40
Roebling,N.J. R5 ..... 6.50
S.Chicago,Ill. R2, W14 .. 6.40
SparrowsPoint,Md. B2 .. 6.50
Sterling,Ill.(1) N15 .... 6.40
Sterling,Ill. N15 ..... 6.50
Struthers,O. Y1 ..... 6.40
Worcester,Mass. A7 .... 6.70

STRUCTURALS

Carbon Steel Std. Shapes

AlabamaCity,Ala. R2 ..... 5.50
Atlanta A11 ..... 5.70
Aliquippa,Pa. J5 ..... 5.50
Bessemer,Ala. T2 ..... 5.50
Bethlehem,Pa. B2 ..... 5.55
Birmingham C15 ..... 5.50
Clairton,Pa. U5 ..... 5.50
Fairfield,Ala. T2 ..... 5.50
Fontana,Calif. K1 ..... 6.30
Gary,Ind. U5 ..... 5.50
Geneva,Utah C11 ..... 5.50
Houston S5 ..... 5.60
Ind.Harbor,Ind. I-2, Y1 .. 5.50
Johnstown,Pa. B2 ..... 5.55
Joliet,Ill. P22 ..... 5.50
KansasCity,Mo. S5 ..... 5.60
Lackawanna,N.Y. B2 .. 5.55
LosAngeles B3 ..... 5.975
Minnequa,Colo. C10 .... 5.80
Munhall,Pa. U5 ..... 5.50
Niles,Calif. P1 ..... 6.25
Phoenixville,Pa. P4 .... 5.55
Portland,Oreg. O4 .... 6.025
Seattle B3 ..... 6.025
S.Chicago,Ill. U5, W14 .. 5.50
S.SanFrancisco B3 .... 5.925
Sterling,Ill. N15 ..... 5.50
Torrance,Calif. C11 .... 5.975
Weirton,W.Va. W6 ..... 5.50

Wide Flange

Bethlehem,Pa. B2 ..... 5.55
Clairton,Pa. U5 ..... 5.50
Fontana,Calif. K1 ..... 6.45
IndianaHarbor,Ind. I-2 .. 5.50
Lackawanna,N.Y. B2 .. 5.55
Munhall,Pa. U5 ..... 5.50
Phoenixville,Pa. P4 .... 5.55
S.Chicago,Ill. U5 ..... 5.50
Weirton,W.Va. W6 ..... 5.50

Alloy Std. Shapes

Aliquippa,Pa. J5 ..... 6.80
Clairton,Pa. U5 ..... 6.55
Gary,Ind. U5 ..... 6.55
Houston S5 ..... 6.90
KansasCity,Mo. S5 .... 6.90
Munhall,Pa. U5 ..... 6.55
S.Chicago,Ill. U5 ..... 6.55
S.Chicago,Ill. W14 ..... 6.80

H.S., L.A. Std. Shapes

Aliquippa,Pa. J5 ..... 8.05
Bessemer,Ala. T2 ..... 8.05
Bethlehem,Pa. B2 ..... 8.10
Clairton,Pa. U5 ..... 8.05
Fairfield,Ala. T2 ..... 8.05
Fontana,Calif. K1 ..... 8.85
Gary,Ind. U5 ..... 8.05
Geneva,Utah C11 ..... 8.05
Houston S5 ..... 8.15
Ind.Harbor,Ind. I-2, Y1 .. 8.05
Johnstown,Pa. B2 ..... 8.10
KansasCity,Mo. S5 .... 8.15
Lackawanna,N.Y. B2 .. 8.10
LosAngeles B3 ..... 8.45
Munhall,Pa. U5 ..... 8.05
Seattle B3 ..... 8.50
S.Chicago,Ill. U5, W14 .. 8.05
S.SanFrancisco B3 .... 8.40
Struthers,O. Y1 ..... 8.05

H.S., L.A. Wide Flange

Bethlehem,Pa. B2 ..... 7.80
Ind.Harbor,Ind. I-2 .... 8.05
Lackawanna,N.Y. B2 .. 7.80
Munhall,Pa. U5 ..... 8.05
S.Chicago,Ill. U5 ..... 8.05

PILING

BEARING PILES

Bethlehem,Pa. B2 ..... 5.55
Ind.Harbor,Ind. I-2 .... 5.50
Lackawanna,N.Y. B2 .. 5.55
Munhall,Pa. U5 ..... 5.50
S.Chicago,Ill. I-2, U5 .. 5.50

STEEL SHEET PILING

Ind.Harbor,Ind. I-2 .... 6.50
Lackawanna,N.Y. B2 .. 6.50
Munhall,Pa. U5 ..... 6.50
S.Chicago,Ill. I-2, U5 .. 6.50
Weirton,W.Va. W6 ..... 6.50

PLATES

PLATES, Carbon Steel

AlabamaCity,Ala. R2 ..... 5.30
Aliquippa,Pa. J5 ..... 5.30
Ashland,Ky.(15) A10 .... 5.10
Atlanta A11 ..... 5.50
Bessemer,Ala. T2 ..... 5.30
Clairton,Pa. U5 ..... 5.30
Claymont,Del. C22 ..... 5.30
Cleveland J5, R2 ..... 5.30
Coatesville,Pa. L7 ..... 5.30
Conshohocken,Pa. A3 .. 5.30
Ecorse,Mich. G5 ..... 5.10
Fairfield,Ala. T2 ..... 5.30
Farrell,Pa. S3 ..... 5.30
Fontana,Calif.(30) K1 .. 6.10
Gary,Ind. U5 ..... 5.30
Geneva,Utah C11 ..... 5.30
GraniteCity, Ill. G4 ..... 5.40
Harrisburg,Pa. P4 ..... 5.30
Houston S5 ..... 5.40
Ind.Harbor,Ind. I-2, Y1 .. 5.30
Johnstown,Pa. B2 ..... 5.30
Lackawanna,N.Y. B2 .. 5.30
Mansfield,O. E6 ..... 5.30
Minnequa,Colo. C10 .... 6.15
Munhall,Pa. U5 ..... 5.30
Newport,Ky. A2 ..... 5.30
Pittsburgh J5 ..... 5.30
Riverdale,Ill. A1 ..... 5.30
Seattle B3 ..... 6.00
Sharon,Pa. S3 ..... 5.30
S.Chicago,Ill. U5, W14 .. 5.30
SparrowsPoint,Md. B2 .. 5.30
Sterling,Ill. N15 ..... 5.30
Steubenville,O. W10 .... 5.30
Warren,O. R2 ..... 5.30
Youngstown U5, Y1 .... 5.30

PLATES, Carbon Abras. Resist.

Claymont,Del. C22 .... 6.75
Fontana,Calif. K1 ..... 7.75
Geneva,Utah C11 ..... 7.05
Houston S5 ..... 7.15
Johnstown,Pa. B2 ..... 7.05
SparrowsPoint,Md. B2 .. 7.05

PLATES, Wrought Iron

Economy,Pa. B14 ..... 13.15

PLATES, H.S., L.A.

Aliquippa,Pa. J5 ..... 7.95
Bessemer,Ala. T2 ..... 7.95
Clairton,Pa. U5 ..... 7.95
Claymont,Del. C22 ..... 7.95
Cleveland J5, R2 ..... 7.95
Coatesville,Pa. L7 .... 7.625
Conshohocken,Pa. A3 .. 7.95
Economy,Pa. B14 ..... 7.625
Ecorse,Mich. G5 ..... 7.625
Fairfield,Ala. T2 ..... 7.95
Farrell,Pa. S3 ..... 7.95
Fontana,Calif.(30) K1 .. 8.75
Gary,Ind. U5 ..... 7.95
Geneva,Utah C11 ..... 7.95
Houston S5 ..... 8.05
Ind.Harbor,Ind. I-2, Y1 .. 7.95
Johnstown,Pa. B2 ..... 7.95
Munhall,Pa. U5 ..... 7.95
Pittsburgh J5 ..... 7.95
Seattle B3 ..... 8.525
Sharon,Pa. S3 ..... 7.95
S.Chicago,Ill. U5, W14 .. 7.95
SparrowsPoint,Md. B2 .. 7.95
Warren,O. R2 ..... 7.95
Youngstown U5, Y1 .... 7.95

PLATES, ALLOY

Aliquippa,Pa. J5 ..... 7.50
Claymont,Del. C22 ..... 7.50
Coatesville,Pa. L17 ..... 7.50
Economy,Pa. B14 ..... 7.20
Farrell,Pa. S3 ..... 7.50
Fontana,Calif. K1 ..... 8.30
Gary,Ind. U5 ..... 7.50
Houston S5 ..... 7.60
Ind.Harbor,Ind. Y1 .... 7.20
Johnstown,Pa. B2 ..... 7.50
Lowellville,O. S3 ..... 7.50
Munhall,Pa. U5 ..... 7.50
Newport,Ky. A2 ..... 7.50
Pittsburgh J5 ..... 7.20
Seattle B3 ..... 8.10
Sharon,Pa. S3 ..... 7.50
S.Chicago,Ill. U5, W14 .. 7.50
SparrowsPoint,Md. B2 .. 7.50
Youngstown Y1 ..... 7.20

FLOOR PLATES

Cleveland J5 ..... 6.375
Conshohocken,Pa. A3 .. 6.375
Ind.Harbor,Ind. I-2 .... 6.375
Munhall,Pa. U5 ..... 6.375
S.Chicago,Ill. U5 ..... 6.375

PLATES, Ingot Iron

Ashland c.l.(15) A10 .. 5.35
Ashland l.c.l.(15) A10 .. 5.85
Cleveland c.l. R2 ..... 6.05
Warren,O. c.l. R2 ..... 6.05

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)

Ala.City,Ala.(9) R2 .. 5.675
Aliquippa,Pa.(9) J5 .. 5.675
Alton,Ill. L1 ..... 5.875
Atlanta(9) A11 ..... 5.875
Bessemer,Ala.(9) T2 .. 5.425
Birmingham(9) C15 .... 5.675
Buffalo(9) R2 ..... 5.675
Canton,O.(23) R2 ..... 6.15
Clairton,Pa.(9) U5 .... 5.675
Cleveland(9) R2 ..... 5.675
Ecorse,Mich.(9) G5 .... 5.675
Emeryville,Calif. J7 .... 6.425
Fairfield,Ala.(9) T2 .. 5.675
Fairless,Pa.(9) U5 ..... 5.825
Fontana,Calif.(9) K1 .. 6.375
Gary,Ind.(9) U5 ..... 5.675
Houston(9) S5 ..... 5.925
Ind.Harbor(9) I-2, Y1 .. 5.675
Johnstown,Pa.(9) B2 .. 5.675
Joliet,Ill. P22 ..... 5.675
KansasCity,Mo.(9) S5 .. 5.925
Lackawanna(9) B2 .... 5.675
LosAngeles(9) B3 .... 6.125
Massillon,O.(23) R2 .... 6.15
Midland,Pa.(23) C18 .. 6.025
Milton,Pa. M18 ..... 5.825
Minnequa,Colo. C10 .... 6.125
Niles,Calif. P1 ..... 6.375
N.Tonawanda,N.Y.(23) B11 6.025
Owensboro,Ky.(9) G8 .. 5.425
Pittsburg,Calif.(9) C11 .. 6.375
Pittsburgh(9) J5 ..... 5.675
Portland,Oreg. O4 .... 6.175
Seattle B3, N14 ..... 6.175
S.Ch'c'go(9)R2,U5,W14 5.675
S.Duquesne,Pa.(9) U5 .. 5.675
S.SanFran.,Calif.(9)B3 6.175
Sterling,Ill.(1)(9) N15 .. 5.675
Sterling,Ill.(9) N15 .... 5.775
Struthers,O.(9) Y1 .... 5.675
Tonawanda,N.Y. B12 ..... 5.675
Torrance,Calif.(9) C11 .. 6.375
Warren,O. C17 ..... 6.025
Youngstown(9) R2, U5 .. 5.675

BARS, Hot-Rolled Alloy

Aliquippa,Pa. J5 ..... 6.725
Bethlehem,Pa. B2 ..... 6.725
Bridgeport,Conn. C32 ..... 6.80
Buffalo R2 ..... 6.725
Canton,O. R2, T7 .... 6.725
Clairton,Pa. U5 ..... 6.725
Detroit S41 ..... 6.475
Economy,Pa. B14 ..... 6.475
Ecorse,Mich. G5 ..... 6.725
Fairless,Pa. U5 ..... 6.875
Farrell,Pa. S3 ..... 6.725
Fontana,Calif. K1 ..... 7.775
Gary,Ind. U5 ..... 6.725
Houston S5 ..... 6.975
Ind.Harbor,Ind. I-2, Y1 .. 6.725
Johnstown,Pa. B2 ..... 6.725
KansasCity,Mo. S5 .... 6.975
Lackawanna,N.Y. B2 .. 6.725
Lowellville,O. S3 ..... 6.725
LosAngeles B3 ..... 7.525
Massillon,O. R2 ..... 6.725
Midland,Pa. C18 ..... 6.725
Owensboro,Ky. G8 .... 6.475
Pittsburgh J5 ..... 6.725
Sharon,Pa. S3 ..... 6.725
S.Chicago R2, U5, W14 .. 6.725
S.Duquesne,Pa. U5 .... 6.725
Struthers,O. Y1 ..... 6.725
Warren,O. C17 ..... 6.725
Youngstown U5 ..... 6.725

BARS & SMALL SHAPES, H.R. High-Strength, Low-Alloy

Aliquippa,Pa. J5 ..... 8.30
Bessemer,Ala. T2 ..... 7.925
Bethlehem,Pa. B2 ..... 8.30
Clairton,Pa. U5 ..... 7.925
Cleveland R2 ..... 8.30
Ecorse,Mich. G5 ..... 8.30
Fairfield,Ala. T2 ..... 7.925
Fontana,Calif. K1 .... 8.625
Gary,Ind. U5 ..... 7.925
Houston S5 ..... 8.175
Ind.Harbor,Ind. Y1 .... 8.30
Johnstown,Pa. B2 ..... 8.30
KansasCity,Mo. S5 .... 8.175
Lackawanna,N.Y. B2 .. 8.30
LosAngeles B3 ..... 8.625
Pittsburgh J5 ..... 8.30
Seattle B3 ..... 8.675
S.Chicago,Ill. W14 ..... 8.30
S.Duquesne,Pa. U5 .... 7.925
S.SanFrancisco B3 .... 8.675
Struthers,O. Y1 ..... 8.30

BAR SIZE ANGLES; H.R. Carbon

Bethlehem,Pa.(9) B2 .. 5.825
Houston(9) S5 ..... 5.925
KansasCity,Mo.(9) S5 .. 5.925
Lackawanna(9) B2 .... 5.675
Sterling,Ill. N15 ..... 5.525
Sterling,Ill.(1) N15 .... 5.425
Tonawanda,N.Y. B12 ..... 5.675

BAR SIZE ANGLES; S. Shapes

Aliquippa,Pa. J5 ..... 5.675
Atlanta A11 ..... 5.875
Joliet,Ill. P22 ..... 5.675
Minnequa,Colo. C10 .... 6.125
Niles,Calif. P1 ..... 6.375
Pittsburgh J5 ..... 5.675
Portland,Oreg. O4 .... 6.175
SanFrancisco S7 ..... 6.52
Seattle B3 ..... 6.175

BAR SHAPES, Hot-Rolled Alloy

Aliquippa,Pa. J5 ..... 6.80
Clairton,Pa. U5 ..... 6.80
Gary,Ind. U5 ..... 6.80
Houston S5 ..... 7.05
KansasCity,Mo. S5 .... 7.05
Pittsburgh J5 ..... 6.80
Youngstown U5 ..... 6.80

BARS, C. F. Leaded (Including leaded extra)

Carbon

LosAngeles P2, S30 ... 11.75*

Alloy

Ambridge,Pa. W18 .... 10.175
BeaverFalls,Pa. M12 .. 10.175
Camden,N.J. P13 ..... 10.35
Chicago W18 ..... 10.175
Elyria,O. W8 ..... 10.175
Monaca,Pa. S17 ..... 10.175
Newark,N.J. W18 ..... 10.35
SpringCity,Pa. K3 .... 10.35

*Grade A; add 0.050c for Grade B.

BARS, Cold-Finished Carbon

Ambridge,Pa. W18 .... 7.65
BeaverFalls,Pa. M12,R2 7.65
Birmingham C15 ..... 8.25
Buffalo B5 ..... 7.70
Camden,N.J. P13 ..... 8.10
Carnegie,Pa. C12 ..... 7.65
Chicago W18 ..... 7.65
Cleveland A7, C20 .... 7.65
Detroit B5, P17 ..... 7.85
Detroit S41 ..... 7.30
Donora,Pa. A7 ..... 7.65
Elyria,O. W8 ..... 7.65
FranklinPark,Ill. N5 .. 7.30
Gary,Ind. R2 ..... 7.65
GreenBay,Wis. F7 ..... 7.65
Hammond,Ind. J5, L2 .. 7.65
Hartford,Conn. R2 .... 8.15
Harvey,Ill. B5 ..... 7.65
LosAngeles(49) S30 .... 9.10
LosAngeles(49) P2, R2 9.10
Mansfield,Mass. B2 .... 8.20
Massillon,O. R2, R8 .... 7.65
Midland,Pa. C18 ..... 7.65
Monaca,Pa. S17 ..... 7.65
Newark,N.J. W18 ..... 8.10
NewCastle,Pa.(17) B4 ..... 7.65
Pittsburgh J5 ..... 7.65
Plymouth,Mich. P5 .... 7.90
Putnam,Conn. W18 .... 8.20
Readville,Mass. C14 .... 8.20
S.Chicago,Ill. W14 .... 7.65
SpringCity,Pa. K3 .... 8.10
Struthers,O. Y1 ..... 7.65
Warren,O. C17 ..... 7.65
Willimantic,Conn. J5 .. 8.15
Waukegan,Ill. A7 ..... 7.65
Youngstown F3, Y1 .... 7.65

BARS, Cold-Finished Carbon (Turned and Ground)

Cumberland,Md.(5) C19 .. 6.55

BARS, Cold-Finished Alloy

Ambridge,Pa. W18 .... 9.025
BeaverFalls,Pa. M12,R2 9.025
Bethlehem,Pa. B2 .... 9.025
Bridgeport,Conn. C32 .. 9.175
Buffalo B5 ..... 9.025
Camden,N.J. P13 ..... 9.20
Canton,O. T7 ..... 8.775
Carnegie,Pa. C12 ..... 9.025
Chicago W18 ..... 9.025
Cleveland A7, C20 .... 9.025
Detroit B5, P17 ..... 9.225
Detroit S41 ..... 8.775
Donora,Pa. A7 ..... 8.775
Elyria,O. W8 ..... 9.025
FranklinPark,Ill. N5 .. 8.775
Gary,Ind. R2 ..... 9.025
GreenBay,Wis. F7 ..... 9.025
Hammond,Ind. J5, L2 .. 9.025
Hartford,Conn. R2 .... 9.325
Harvey,Ill. B5 ..... 9.025
Lackawanna,N.Y. B2 .. 9.025
LosAngeles P2, S30 .... 11.00
Mansfield,Mass. B5 .... 9.325
Massillon,O. R2, R8 .... 9.025
Midland,Pa. C18 ..... 9.025
Monaca,Pa. S17 ..... 9.025
Newark,N.J. W18 ..... 9.20
Plymouth,Mich. P5 .... 9.225
S.Chicago,Ill. W14 .... 9.025
SpringCity,Pa. K3 .... 9.20
Struthers,O. Y1 ..... 9.025
Warren,O. C17 ..... 9.025
Waukegan,Ill. A7 ..... 8.775
Willimantic,Conn. J5 .. 9.325
Worcester,Mass. A7 .... 9.075
Youngstown F3, Y1 .... 9.025

BARS, Reinforcing (To fabricators)

AlabamaCity,Ala. R2 ..5.675
Atlanta A11 .....5.675
Birmingham C15 .....5.675
Buffalo R2 .....5.675
Cleveland R2 .....5.675
Ecorse,Mich. G5 .....5.675
Emeryville,Calif. J7 ...6.425
Fairfield,Ala. T2 .....5.675
Fairless,Pa. U5 .....5.825
Fontana,Calif. K1 .....6.375
Ft.Worth,Tex.(4)(26)T4 6.125
Gary,Ind. U5 .....5.675
Houston S5 .....5.925
Ind.Harbor,Ind. I-2, Y1 5.675
Johnstown,Pa. B2 ....5.675
Joliet,Ill. P22 .....5.675
KansasCity,Mo. S5 ....5.925
Kokomo,Ind. C16 .....5.775
Lackawanna,N.Y. B2 ..5.675
LosAngeles B3 .....6.125
Madison,Ill. L1 .....5.625
Milton,Pa. M18 .....5.825
Minnequa,Colo. C10 ...6.125
Nies,Calif. P1 .....6.375
Pittsburg,Calif. C11 ..6.375
Pittsburgh J5 .....5.675
Portland,Oreg. O4 ....6.175
SandSprings,Okla. S5 ..5.925
Seattle B3, N14 .....6.175
S.Chicago,Ill. R2, W14 5.675
S.Duquesne,Pa. U5 ....5.675
S.SanFrancisco B3 ....6.175
SparrowsPoint,Md. B2 .5.675
Sterling,Ill.(1) N15 ....5.675
Sterling,Ill. N15 .....5.775
Struthers,O. Y1 .....5.675
Tonawanda,N.Y. B12 ..6.10
Torrance,Calif. C11 ...6.375
Youngstown R2, U5 ..5.675

BARS, Reinforcing (Fabricated; to Consumers)

Boston B2, U8 .....8.15
Chicago U8 .....7.41
Cleveland U8 .....7.39
Houston S5 .....7.35
Johnstown,Pa. B2 .....7.08
KansasCity,Mo. S5 ....7.35
Lackawanna,N.Y. B2 ..6.85
Marion,O. P11 .....6.70
Newark,N.J. U8 .....7.80
Philadelphia U8 .....7.63
Pittsburgh J5, U8 .....7.35
SandSprings,Okla. S5 ...7.60
Seattle B3, N14 .....7.70
SparrowsPt.,Md. B2 ...7.08
St.Paul U8 .....8.17
Williamsport,Pa. S19 ...7.25

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 14.45
Economy,Pa.(D.R.)B14 18.00
Economy(Staybolt)B14 18.45

RAIL STEEL BARS

ChicagoHts.(3) C2, I-2 5.575
ChicagoHts.(4)(44) I-2 5.675
ChicagoHts.(4) C2 ....5.675
Franklin,Pa.(3) F5 ....5.575
Franklin,Pa.(4) F5 ....5.675
JerseyShore,Pa.(3) J8 ..5.30
Marion,O.(3) P11 .....5.325
Tonawanda(3) B12 .....5.575
Tonawanda(4) B12 .....6.10

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

AlabamaCity,Ala. R2 ...5.10
Allenport,Pa. P7 .....5.10
Aliquippa,Pa. J5 .....5.10
Ashland,Ky.(8) A10 ....5.10
Cleveland J5, R2 .....5.10
Conshohocken,Pa. A3 ..5.15
Detroit(8) M1 .....5.10
Ecorse,Mich. G5 .....5.10
Fairfield,Ala. T2 .....5.10
Fairless,Pa. U5 .....5.15
Farrell,Pa. S3 .....5.10
Fontana,Calif. K1 ....5.675
Gary,Ind. U5 .....5.10
Geneva,Utah C11 .....5.20
GraniteCity,Ill.(8) G4 ..5.20
Ind.Harbor,Ind. I-2, Y1 5.10
Irvin,Pa. U5 .....5.10
Lackawanna,N.Y. B2 ..5.10
Mansfield,O. E6 .....5.10
Munhall,Pa. U5 .....5.10
Newport,Ky. A2 .....5.10
Niles,O. M21, S3 .....6.775
Pittsburg,Calif. C11 ....5.80
Pittsburgh J5 .....5.10
Portsmouth,O. P12 .....5.10
Riverdale,Ill. A1 .....5.10
Sharon,Pa. S3 .....5.10
S.Chicago,Ill. U5, W14 5.10
SparrowsPoint,Md. B2 ..5.10
Steubenville,O. W10 ....5.10
Warren,O. R2 .....5.10
Weirton,W.Va. W6 .....5.10
Youngstown U5, Y1 ....5.10

SHEETS, H.R. (19 Ga. & Lighter)

Niles,O. M21 .....6.275

SHEETS, H.R. Alloy

Gary,Ind. U5 .....8.10
Ind.Harbor,Ind. Y1 ....8.10
Irvin,Pa. U5 .....8.10
Munhall,Pa. U5 .....8.10
Newport,Ky. A2 .....8.40
Youngstown U5, Y1 ....8.10

SHEETS, H.R. (14 Ga. & Heavier) High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....7.525
Cleveland J5, R2 .....7.525
Conshohocken,Pa. A3 ..7.575
Ecorse,Mich. G5 .....5.525
Fairfield,Ala. T2 .....7.525
Fairless,Pa. U5 .....7.575
Farrell,Pa. S3 .....7.525
Fontana,Calif. K1 ....8.025
Gary,Ind. U5 .....7.525
Ind.Harbor,Ind. I-2, Y1 7.525
Irvin,Pa. U5 .....7.525
Lackawanna(35) B2 ...7.525
Munhall,Pa. U5 .....7.525
Pittsburgh J5 .....7.525
S.Chicago,Ill. U5, W14 7.525
Sharon,Pa. S3 .....7.525
SparrowsPoint(36) B2..7.525
Warren,O. R2 .....7.525
Weirton,W.Va. W6 ....7.525
Youngstown U5, Y1 ..7.525

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 ...5.35
Cleveland R2 .....5.875
Warren,O. R2 .....5.875

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....7.05
Middletown,O. A10 ...6.775
Warren,O. R2 .....7.05

SHEETS, Cold-Rolled Steel (Commercial Quality)

AlabamaCity,Ala. R2 ..6.275
Allenport,Pa. P7 .....6.275
Aliquippa,Pa. J5 .....6.275
Cleveland J5, R2 .....6.275
Conshohocken,Pa. A3 ..6.325
Detroit M1 .....6.275
Ecorse,Mich. G5 .....6.275
Fairfield,Ala. T2 .....6.275
Fairless,Pa. U5 .....6.325
Follansbee,W.Va. F4 ..6.275
Fontana,Calif. K1 .....7.30
Gary,Ind. U5 .....6.275
GraniteCity,Ill. G4 ....6.375
Ind.Harbor,Ind. I-2, Y1 6.275
Irvin,Pa. U5 .....6.275
Lackawanna,N.Y. B2 ..6.275
Mansfield,O. E6 .....6.275
Middletown,O. A10 ....6.275
Newport,Ky. A2 .....6.275
Pittsburg,Calif. C11 ...7.225
Pittsburgh J5 .....6.275
Portsmouth,O. P12 ....6.275
SparrowsPoint,Md. B2..6.275
Steubenville,O. W10 ...6.275
Warren,O. R2 .....6.275
Weirton,W.Va. W6 ....6.275
Yorkville,O. W10 .....6.275
Youngstown Y1 .....6.275

SHEETS, Cold-Rolled, High-Strength, Low Alloy

Aliquippa,Pa. J5 .....9.275
Cleveland J5, R2 .....9.275
Ecorse,Mich. G5 .....9.275
Fairless,Pa. U5 .....9.325
Fontana,Calif. K1 ...10.275
Gary,Ind. U5 .....9.275
Ind.Harbor,Ind. I-2,Y1 9.275
Irvin,Pa. U5 .....9.275
Lackawanna(37) B2 ..9.275
Pittsburgh J5 .....9.275
SparrowsPoint(38) B2..9.275
Warren,O. R2 .....9.275
Weirton,W.Va. W6 ....9.275
Youngstown Y1 .....9.275

SHEETS, Culvert

	Cu Steel	Cu Fe
Ashland,Ky. A10	7.225	7.475
Canton,O. R2	7.225	7.75
Fairfield T2	7.225	7.475
Gary,Ind. U5	7.225	7.475
GraniteCity,Ill G4	7.325	....
Ind.Harbor I-2	7.225	7.475
Irvin,Pa. U5	7.225	7.475
Kokomo,Ind. C16	7.325	....
MartinsFry. W10	7.225	7.475
Pitts.,Calif. C11	7.975	....
Pittsburgh J5	7.225	....
SparrowsPt. B2	7.225	....

SHEETS, Culvert—Pure Iron

Ind.Harbor,Ind. I-2 ..7.475

SHEETS, Galvanized Steel Hot-Dipped

AlabamaCity,Ala. R2.6.875‡
Ashland,Ky. A10 .....6.875†
Canton,O. R2 .....6.875‡
Dover,O. E6 .....6.875†
Fairfield,Ala. T2 .....6.875†
Gary,Ind. U5 .....6.875†
GraniteCity,Ill. G4 ..6.975*
Ind.Harbor,Ind. I-2 ..6.875†
Irvin,Pa. U5 .....6.875†
Kokomo,Ind. C16 ....6.975‡
MartinsFerry,O. W10 ..6.875*
Middletown,O. A10 ..6.875†
Pittsburg,Calif. C11 ..7.625*
Pittsburgh J5 .....6.875†
SparrowsPt.,Md. B2 ..6.875†
Warren,O. R2 .....6.875†
Weirton,W.Va. W6 ...6.875*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Well Casing

Fontana,Calif. K1 ....7.175

SHEETS, Galvanized High-Strength, Low-Alloy

Irvin,Pa. U5 .....10.025
SparrowsPt.(39) B2 ..10.025
Pittsburgh J5 .....10.025

SHEETS, Galvannealed Steel

Canton,O. R2 .....7.275
Irvin,Pa. U5 .....7.275

SHEETS, Galvanized Ingot Iron (Hot-Dipped Continuous)

Ashland,Ky. A10 .....7.125
Middletown,O. A10 ....7.125

SHEETS, Electrogalvanized

Cleveland(28) R2 .....7.65
Niles,O.(28) R2 .....7.65
Youngstown J5 .....7.50
Weirton,W.Va. W6 ....7.50

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1) 9.525
Butler,Pa. A10 (type 2) 9.625

SHEETS, Enameling Iron

Ashland,Ky. A10 .....6.775
Cleveland R2 .....6.775
Fairfield,Ala. T2 .....6.775
Gary,Ind. U5 .....6.775
GraniteCity,Ill. G4 ....6.875
Ind.Harbor,Ind. I-2,Y1.6.775
Irvin,Pa. U5 .....6.775
Middletown,O. A10 ....6.775
Niles,O. M21, S3 .....6.775
Youngstown Y1 .....6.775

BLUED STOCK, 29 Gage

Follansbee,W.Va. F4 ..8.70
Ind.Harbor,Ind. I-2 ...8.70
Mansfield,O. E6 .....8.70
Yorkville,O. W10 .....8.70

SHEETS, Long Terne, Steel (Commercial Quality)

BeechBottom,W.Va.W10 7.225
Gary,Ind. U5 .....7.225
Mansfield,O. E6 .....7.225
Middletown,O. A10 ....7.225
Niles,O. M21, S3 .....7.225
Warren,O. R2 .....7.225
Weirton,W.Va. W6 .....7.225

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....7.625

Key To Producers

A1 Acme Steel Co.
A2 Acme-Newport Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B11 Buffalo Bolt Co., Div., Buffalo Eclipse Corp.
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div. H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Plant, Wickwire Spencer Steel Div., Colo. Fuel & Iron
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.
C32 CarpenterSteelofN.Eng.

D2 Detroit Steel Corp.
D3 Dearborn Div., Sharon Steel Corp.
D4 Disston Div., H. K. Porter Co. Inc.
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas&FuelAssoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire-Reeves Steel Corp.

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.
G8 Green River Steel Corp.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins Steel Tube Works
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L6 Lone Star Steel Co.
L7 Lukens Steel Co.
L8 Leschen Wire Rope Div., H. K. Porter Co. Inc.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M14 McInnes Steel Co.
M16 Md.Fine&Special.Wire
M17 Metal Forming Corp.
M18 Milton Steel Div., Merritt-Chapman&Scott
M21 Mallory-Sharon Metals Corp.
M22 Mill Strip Products Co.

N1 National-Standard Co.
N2 National Supply Co.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N14 Northwest. Steel Rolling Mills Inc.
N15 Northwestern S.&W.Co.
N20 Neville Ferro Alloy Co.
O4 Oregon Steel Mills
P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co., Sub. of Barium Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Div., Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., American Chain & Cable
P17 Plymouth Steel Corp.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.
P24 Phil. Steel & Wire Corp.

R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R8 Reliance Div., Eaton Mfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Div., Copperweld Steel Co.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.
S40 Seneca Steel Service
S41 Stainless Steel Div., J&L Steel Corp.
S42 Southern Elec. Steel Co.

T2 Tenn. Coal & Iron Div., U. S. Steel Corp.
T3 Tenn. Products & Chemical Corp.
T4 Texas Steel Co.
T5 Thomas Strip Div., Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div., U. S. Steel Corp.
V2 Vanadium-Alloys Steel
V3 Vulcan-Kidd Steel Div., H. K. Porter Co.
W1 Wallace Barnes Steel Div., Associated Spring Corp.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.
Y1 Youngstown Sheet & Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2 ..5.10
Allenport,Pa. P7 .....5.10
Alton,Ill. L1 .....5.30
Ashland,Ky.(8) A10 ....5.10
Atlanta A11 .....5.10
Bessemer,Ala. T2 .....5.10
Birmingham C15 .....5.10
Buffalo(27) R2 .....5.10
Conshohocken,Pa. A3 ..5.15
Detroit M1 .....5.10
Ecorse,Mich. G5 .....5.10
Fairfield,Ala. T2 .....5.10
Farrell,Pa. S3 .....5.10
Fontana,Calif. K1 .....5.675
Gary,Ind. U5 .....5.10
Ind.Harbor,Ind. I-2, Y1 5.10
Johnstown,Pa.(25) B2 ..5.10
Lackaw'na,N.Y.(25) B2 5.10
LosAngeles(25) B3 ....5.85
Minnequa,Colo. C10 ....6.20
Riverdale,Ill. A1 .....5.10
SanFrancisco S7 .....6.60
Seattle(25) B3 .....6.10
Seattle N14 .....6.35
Sharon,Pa. S3 .....5.10
S.Chicago W14 .....5.10
S.SanFrancisco(25) B3 5.85
SparrowsPoint,Md. B2 ..5.10
Sterling,Ill.(1) N15 ..4.925
Sterling,Ill. N15 .....5.025
Torrance,Calif. C11 ....5.85
Warren,O. R2 .....5.10
Weirton,W.Va. W6 ....5.10
Youngstown U5 .....5.10

STRIP, Hot-Rolled Alloy

Carnegie,Pa. S18 .....8.10
Farrell,Pa. S3 .....8.40
Gary,Ind. U5 .....8.10
Houston S5 .....8.35
Ind.Harbor,Ind. Y1 ....8.10
KansasCity,Mo. S5 ....8.35
LosAngeles B3 .....9.30
Lowellville,O. S3 .....8.40
Newport,Ky. A2 .....8.40
Sharon,Pa. A2, S3 .....8.40
S.Chicago,Ill. W14 ....8.10
Youngstown U5, Y1 ....8.10

STRIP, Hot-Rolled High-Strength, Low-Alloy

Bessemer,Ala. T2 ....7.575
Conshohocken,Pa. A3 ..7.575
Ecorse,Mich. G5 .....7.575
Fairfield,Ala. T2 .....7.575
Farrell,Pa. S3 .....7.575
Gary,Ind. U5 .....7.575
Ind.Harbor,Ind. I-2,Y1 7.575
Lackawanna,N.Y. B2 ..7.575
LosAngeles(25) B3 ....8.325
Seattle(25) B3 .....8.575
Sharon,Pa. S3 .....7.575
S.Chicago,Ill. W14 ....7.575
S.SanFrancisco(25) B3 8.325
SparrowsPoint,Md. B2 7.575
Warren,O. R2 .....7.575
Weirton,W.Va. W6 ....7.575
Youngstown U5, Y1 ..7.575

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10 ...5.35
Warren,O. R2 .....5.875

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6 .....7.425
Baltimore T6 .....7.425
Boston T6 .....7.975
Buffalo S40 .....7.425
Cleveland A7, J5 .....7.425
Dearborn,Mich. D3 ....7.425
Detroit D2, M1, P20 ..7.425
Dover,O. G6 .....7.425
Ecorse,Mich. G5 .....7.15
Evanston,Ill. M22 ....7.525
Farrell,Pa. S3 .....7.425
Follansbee,W.Va. F4 ..7.425
Fontana,Calif. K1 .....9.00
FranklinPark,Ill. T6 ..7.525
Ind.Harbor,Ind. Y1 ....7.425
Indianapolis J5 .....7.575
LosAngeles J5 .....9.325
LosAngeles C1 .....9.20
NewBedford,Mass. R10 7.875
NewBritain,Conn. S15 ..7.875
NewCastle,Pa. B4, E5 .....7.425
NewHaven,Conn. D2 ..7.875
NewKensington,Pa. A6 .....7.425
Pawtucket,R.I. R3 ....7.975
Pawtucket,R.I. N8 ....7.975
Philadelphia P24 .....7.875
Pittsburgh J5 .....7.425
Riverdale,Ill. A1 .....7.525
Rome,N.Y.(32) R6 .....7.425
Sharon,Pa. S3 .....7.425
Trenton,N.J.(31) R5 .....8.975
Wallingford,Conn. W2 ..7.875
Warren,O. R2, T5 ....7.425
Weirton,W.Va. W6 ..7.425
Worcester,Mass. A7 ...7.975
Youngstown J5, Y1 ....7.425

STRIP, Cold-Rolled Alloy

Boston T6 .....15.90
Carnegie,Pa. S18 .....15.05
Cleveland A7 .....15.05
Dover,O. G6 .....15.05
Farrell,Pa. S3 .....15.55
FranklinPark,Ill. T6 .....15.55
Harrison,N.J. C18 ....15.05
Indianapolis J5 .....15.20
Lowellville,O. S3 .....15.55
Pawtucket,R.I. N8 ....15.40
Riverdale,Ill. A1 ....15.05
Sharon,Pa. S3 .....15.55
Worcester,Mass. A7 ...15.35
Youngtown J5 .....15.05

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7 .....10.80
Dearborn,Mich. D3 ....10.80
Dover,O. G6 .....10.45
Ecorse,Mich. G5 .....10.50
Farrell,Pa. S3 .....10.80
Ind.Harbor,Ind. Y1 ....10.80
Sharon,Pa. S3 .....10.80
Warren,O. R2 .....10.80

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	9.50	10.70	12.90	15.90	18.85
Boston T6	9.50	10.70	12.90	15.90	18.85
Bristol,Conn. W1	...	10.70	12.90	16.10	19.30
Carnegie,Pa. S18	8.95	10.40	12.60	15.60	....
Cleveland A7	8.95	10.40	12.60	15.60	18.55
Dearborn,Mich. D3	9.05	10.50	12.70	....	....
Detroit D2	9.05	10.50	12.70	15.70	....
Dover,O. G6	8.95	10.40	12.60	15.60	18.55
Evanston,Ill. M22	8.95	10.40	12.60	15.60	....
Farrell,Pa. S3	*8.95*	*10.40*	*12.60*	*15.60*	*18.55*
Fostoria,O. S1	10.05	10.40	12.60	15.60	....
FranklinPark,Ill. T6	9.05	10.40	12.60	15.60	18.55
Harrison,N.J. C18	...	....	12.90	16.10	19.30
Indianapolis J5	9.10	10.55	12.60	15.60	18.55
LosAngeles C1	11.15	12.60	14.80	17.80	....
LosAngeles J5	11.15	12.60	14.80	....	....
NewBritain,Conn. S15	9.40	10.70	12.90	15.90	18.85
NewCastle,Pa. B4, E5	8.95	10.40	12.60	15.60	....
NewHaven,Conn. D2	9.40	10.70	12.90	15.90	....
NewKensington,Pa. A6	8.95	10.40	12.60	15.60	....
NewYork W3	...	10.70	12.90	16.10	19.30
Pawtucket,R.I. N8	9.50	10.70	12.90	15.90	18.85
Riverdale,Ill. A1	9.05	10.40	12.60	15.60	18.55
Rome,N.Y.(32) R6	8.95	10.40	12.60	15.60	18.55
Sharon,Pa. S3	8.95	10.40	12.60	15.60	18.55
Trenton,N.J. R5	...	10.70	12.90	16.10	19.30
Wallingford,Conn. W2	9.40	10.70	12.90	15.90	18.75
Warren,O. T5	8.95	10.40	12.60	15.60	18.55
Worcester,Mass. A7, T6..	9.50	10.70	12.90	15.90	18.85
Youngstown J5	8.95	10.40	12.60	15.60	18.55

Spring Steel (Tempered)	Up to 0.80C	0.81-1.05C	1.06-1.35C
Bristol,Conn. W1	18.10	21.95	26.30
Buffalo W12	18.10	....	....
Fostoria,O. S1	18.30	22.15	....
FranklinPark,Ill. T6	*19.20*	*23.30*	*28.15*
Harrison,N.J. C18	18.10	21.95	26.30
NewYork W3	18.10	21.95	26.30
Palmer,Mass. W12	18.10	....	....
Trenton,N.J. R5	*18.85*	*22.95*	*27.80*
Worcester,Mass. T6	*18.85*	*22.95*	*27.50*
Worcester,Mass. A7	18.10	21.95	26.30
Youngstown J5	18.45	22.30	26.65

Weirton,W.Va. W6 ....10.80
Youngstown Y1 .....10.80

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2 .....8.175

STRIP, C.R. Electrogalvanized

Cleveland A7 .....7.15*
Dover,O. G6 .....7.425*
Evanston,Ill. M22 ....7.25*
Riverdale,Ill. A1 .....7.525*
*Warren,O. B9, S3, T5 7.425**
Worcester,Mass. A7 ....7.70*
Youngstown J5 .....7.15*

*Plus galvanizing extras.

STRIP, Galvanized (Continuous)

Farrell,Pa. S3 .....7.50
Sharon,Pa. S3 .....7.50

TIGHT COOPERAGE HOOP

Atlanta A11 .....5.65
Farrell,Pa. S3 .....5.525
Riverdale,Ill. A1 .....5.675
Sharon,Pa. S3 .....5.525
Youngstown U5 .....5.525

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$8.75	$9.00	$9.40
Fairfield,Ala. T2	8.85	9.10	9.50
Fairless,Pa. U5	8.85	9.10	9.50
Fontana,Calif. K1	9.50	9.75	10.15
Gary,Ind. U5	8.75	9.00	9.40
GraniteCity,Ill. G4	8.85	9.10	9.50
IndianaHarbor,Ind. I-2, Y1	8.75	9.00	9.40
Irvin,Pa. U5	8.75	9.00	9.40
Niles,O. R2	8.75	9.00	9.40
Pittsburg,Calif. C11	9.50	9.75	10.15
SparrowsPoint,Md. B2	8.85	9.10	9.50
Weirton,W.Va. W6	8.75	9.00	9.40
Yorkville,O. W10	8.75	9.00	9.40
ELECTROTIN (22-27 Gage; Dollars per 100 lb)			
Aliquippa,Pa. J5	7.725	7.925	....
Niles,O. R2	7.725	7.925	8.125

TIN PLATE, American	1.25 lb	1.50 lb
Aliquippa,Pa.J5	$10.05	$10.30
Fairfield,Ala. T2	10.15	10.40
Fairless,Pa. U5	10.15	10.40
Fontana,Calif.K1	10.80	11.05
Gary,Ind. U5	10.05	10.30
Ind.Harb. Y1	10.05	10.30
Pitts.Calif. C11	10.80	11.05
Sp.Pt.,Md. B2	10.15	10.40
Weirton,W.Va.W6	10.05	10.30
Yorkville,O. W10	10.05	10.30

BLACK PLATE (Base Box)

Aliquippa,Pa. J5 .....$7.85
Fairfield,Ala. T2 .....7.95
Fairless,Pa. U5 .....7.95
Fontana,Calif. K1 .....8.60
Gary,Ind. U5 .....7.85
GraniteCity,Ill. G4 ....7.95
Ind.Harbor,Ind. I-2, Y1..7.85
Irvin,Pa. U5 .....7.85
Niles,O. R2 .....7.85
Pittsburg,Calif. C11 ....8.60
SparrowsPoint,Md. B2 ..7.95
Weirton,W.Va. W6 ....7.85
Yorkville,O. W10 .....7.85

HOLLOWARE ENAMELING Black Plate (29 Gage)

Aliquippa,Pa. J5 .....7.50
Gary,Ind. U5 .....7.50
GraniteCity,Ill. G4 ....7.60
Ind.Harbor,Ind. Y1 ....7.50
Irvin,Pa. U5 .....7.50
Yorkville,O. W10 .....7.50

MANUFACTURING TERNES (Special Coated, Base Box)

Gary,Ind. U5 .....$9.70
Irvin,Pa. U5 .....9.70

ROOFING SHORT TERNES (8 lb Coated, Base Box)

Gary,Ind. U5 .....$11.25

SILICON STEEL

COILS & CUT LENGTHS (22 Ga.)

Fully Processed (Semiprocessed ½c lower)*	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	....	11.70	12.40	13.55	14.65
Brackenridge,Pa. A4	....	....	12.05	13.15	14.20
GraniteCity,Ill. G4	9.975*	11.30*	12.00*	13.15*	....
IndianaHarbor,Ind. I-2	9.875*	11.20*	11.90*	13.05*	....
Mansfield,O. E6	9.875*	11.70	12.40	13.55	14.65
Newport,Ky. A2	9.875*	11.70	12.40	13.55	14.65
Niles,O. M21	9.875*	11.70	12.40	13.55	....
Vandergrift,Pa. U5	9.875*	11.70	12.40	13.55	14.65
Warren,O. R2	9.875*	11.70	12.40	13.55	14.65
Zanesville,O. A10	....	11.70†	12.40	13.55	14.65

	Stator
Vandergrift,Pa. U5	8.10
Mansfield,O. E6	8.10

SHEETS (22 Ga., coils & cut lengths Fully Processed (Semiprocessed ½c lower)

	T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	15.70	16.30	16.80	17.85
Vandergrift,Pa. U5	15.70	16.30	16.80	17.85
Zanesville,O. A10	15.70	16.30	16.80	17.85

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge,Pa. A4	....	17.60	19.20	19.70	20.20	15.25††
Butler,Pa. A10	....	....	19.70	20.20	20.70	....
Vandergrift,Pa. U5	17.10	18.10	19.70	20.20	20.70	15.70
Warren,O. R2	....	....	....	....	....	15.70‡

*Semiprocessed. †Fully processed only. ‡Coils, annealed, semiprocessed ½c lower. ††Coils only.

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2 ..8.00
Aliquippa,Pa. J5 .....8.00
Alton,Ill. L1 .....8.20
Atlanta A1 .....8.00
Bartonville,Ill. K4 ....7.75
Buffalo W12 .....8.00
Chicago W13 .....8.00
Cleveland A7, C20 .....8.00
Crawfordsville,Ind. M8 .....8.10
Donora,Pa. A7 .....8.00
Duluth A7 .....8.00
Fairfield,Ala. T2 .....8.00
Fostoria,O.(24) S1 .....8.10
Houston S5 .....8.25
Jacksonville,Fla. 8.35
Johnstown,Pa. B2 .....8.00
Joliet,Ill. A7 .....8.00
KansasCity,Mo. S5 ....8.25
Kokomo,Ind. C16 .....8.10
LosAngeles B3 .....8.60
Minnequa,Colo. C10 ....8.25
Monessen,Pa. P7, P16 ..8.00
N.Tonawanda,N.Y. B11..8.00
Palmer,Mass. W12 .....8.30
Pittburg,Calif. C11 ....8.95
Portsmouth,O. P12 .....8.00
Rankin,Pa. A7 .....8.00
S.Chicago,Ill. R2 .....8.00
S.SanFrancisco C10 ....8.95
SparrowsPoint,Md. B2 ..8.10
Sterling,Ill.(1) N15 ....8.00
Sterling,Ill. N15 .....8.10
Struthers,O. Y1 .....8.00
Waukegan,Ill. A7 .....8.00
Worcester,Mass. A7 ....8.30

WIRE, Cold Heading Carbon

Elyria,O. W8 .....8.00

WIRE, Gal'd., for ACSR

Bartonville,Ill. K4 ....12.65
Buffalo W12 .....13.40
Cleveland A7 .....12.65
Donora,Pa. A7 .....12.65
Duluth A7 .....12.65
Johnstown,Pa. B2 .....12.65
Minnequa,Colo. C10 ..12.775
Monessen,Pa. P7, P16..12.65
Muncie,Ind. I-7 .....12.85
NewHaven,Conn. A7 ..12.95
Palmer,Mass. W12 .....13.70
Pittsburg,Calif. C11 ...13.45
Portsmouth,O. P12 ....12.65
Roebling,N.J. R5 .....12.95
SparrowsPt.,Md. B2 ..12.75
Struthers,O. Y1 .....12.65
Trenton,N.J. A7 .....12.95
Waukegan,Ill. A7 .....12.65
Worcester,Mass. A7 ..12.95

WIRE, Upholstery Spring

Aliquippa,Pa. J5 .....9.75
Alton,Ill. L1 .....9.95
Buffalo W12 .....9.75
Cleveland A7 .....9.75
Donora,Pa. A7 .....9.75
Duluth A7 .....9.75
Johnstown,Pa. B2 .....9.75
KansasCity,Mo. S5 ....10.00
LosAngeles B3 .....10.25
Minnequa,Colo. C10 ....9.95
Monessen,Pa. P7, P16 ..9.75
NewHaven,Conn. A7 ....10.05
Palmer,Mass. W12 .....10.05
Pittsburg,Calif. C11 ..10.25
Portsmouth,O. P12 ....9.75
Roebling,N.J. R5 .....9.60
S.Chicago,Ill. R2 .....9.75
S.SanFrancisco C10 ...10.70
SparrowsPt.,Md. B2 ..9.85
Struthers,O. Y1 .....9.75
Trenton,N.J. A7 .....10.05
Waukegan,Ill. A7 .....9.75
Worcester,Mass. A7 ..10.05

WIRE, MB Spring, High-Carbon

Aliquippa,Pa. J5 .....9.75
Alton,Ill. L1 .....9.95
Bartonville,Ill. K4 ....9.40
Buffalo W12 .....9.75
Cleveland A7 .....9.30
Donora,Pa. A7 .....9.30
Duluth A7 .....9.30
Fostoria,O. S1 .....9.80
Johnstown,Pa. B2 .....9.75
KansasCity,Mo. S5 ....10.00
LosAngeles B3 .....10.25
Milbury,Mass.(12) N6 ..9.60
Minnequa,Colo. C10 ....9.95
Monessen,Pa. P7, P16 ..9.75
Muncie,Ind. I-7 .....9.50
Palmer,Mass. W12 .....10.05
Pittsburg,Calif. C11 ..10.25
Portsmouth,O. P12 ....9.30
Roebling,N.J. R5 .....10.05
S.Chicago,Ill. R2 .....9.75
S.SanFrancisco C10 ....10.70
SparrowsPt.,Md. B2 ....9.85
Struthers,O. Y1 .....9.75
Trenton,N.J. A7 .....9.60
Waukegan,Ill. A7 .....9.30
Worcester,Mass. T6 .....10.05
Worcester,Mass. A7, J4 9.60

WIRE, Fine & Weaving(8" Coils)

Alton,Ill. L1 .....15.80
Bartonville,Ill. K4 ....15.70
Chicago W13 .....15.60
Cleveland A7 .....15.60
Crawfordsville,Ind. M8..15.70
Fostoria,O. S1 .....15.60
Houston S5 .....15.85
Jacksonville,Fla. M8 ..15.95
Johnstown,Pa. B2 ....15.60
KansasCity,Mo. S5 ....15.85
Kokomo,Ind. C16 .....15.60
Minnequa,Colo. C10 ....15.85
Monessen,Pa. P16 .....15.60
Muncie,Ind. I-7 .....15.80
Palmer,Mass. W12 .....16.60
S.SanFrancisco C10 ....10.70
Waukegan,Ill. A7 .....15.60
Worcester,Mass. T6 .....16.60
Worcester,Mass. A7 ....15.90

ROPE WIRE	(A)
Bartonville,Ill. K4	12.75
Buffalo W12	*13.45*
Fostoria,O. S1	12.75
Johnstown,Pa. B2	12.75
Monessen,Pa. P7	12.75
Muncie,Ind. I-7	12.95
Palmer,Mass. W12	*13.75*
Portsmouth,O. P12	12.75
Roebling,N.J. R5	*13.75*
St.Louis L8	12.75
SparrowsPt.,Md. B2	12.85
Struthers,O. Y1	12.75
Worcester,Mass. J4	13.05

(A) Plow and Mild Plow; add 0.25c for Improved Plow

WIRE, Tire Bead

Bartonville,Ill. K4	16.55
Monessen,Pa. P16	16.55
Roebling,N.J. R5	17.05

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	11.65
Baltimore T6	*12.65*
Boston T6	*12.65*
Buffalo W12	11.65
Chicago W13	11.75
Cleveland A7	11.65
Crawfordsville,Ind. MS	11.65
Dover,O. G6	11.65
Farrell,Pa. S3	*11.65*
Fostorla,O. S1	11.65
Franklin Park,Ill. T6	*12.45*
Kokomo,Ind. C16	11.65
Massillon,O. R8	11.65
Milwaukee C23	11.85
Monessen,Pa. P7, P16	11.65
Palmer,Mass. W12	11.95
Pawtucket,R.I. N8	11.95
Philadelphia P24	11.95
Riverdale,Ill. A1	11.75
Rome,N.Y. R6	11.65
Sharon,Pa. S3	11.65
Trenton,N.J. R8	*12.65*
Warren,O. B9	11.65
Worcester,Mass. A7	11.95
Worcester,Mass. T6	*12.65*

NAILS, Stock	**Col.**
AlabamaCity,Ala. R2	173
Aliquippa,Pa. J5	173
Atlanta A11	175
Bartonville,Ill. K4	175
Chicago W13	173
Cleveland A9	173
Crawfordsville,Ind. MS	175
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	178
Jacksonville,Fla. MS	175
Johnstown,Pa. B2	173
Joliet,Ill. A7	173
KansasCity,Mo. S5	178
Kokomo,Ind. C16	175
Minnequa,Colo. C10	178
Monessen,Pa. P7	173
Pittsburg,Calif. C11	192
Rankin,Pa. A7	173
S.Chicago,Ill. R2	173
SparrowsPt.,Md. B2	175
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	179

(To Wholesalers; per cwt)

Galveston,Tex. D7	$9.10

NAILS, Cut (100 lb keg) To Dealers (33)

Wheeling,W.Va. W10	$9.80

POLISHED STAPLES	**Col.**
AlabamaCity,Ala. R2	175
Aliquippa,Pa. J5	175
Atlanta A11	177
Bartonville,Ill. K4	177
Crawfordsville,Ind. MS	177
Donora,Pa. A7	175
Duluth A7	175
Fairfield,Ala. T2	175
Houston S5	180
Jacksonville,Fla. MS	177
Johnstown,Pa. B2	175
Joliet,Ill. A7	175
KansasCity,Mo. S5	180
Kokomo,Ind. C16	177
Minnequa,Colo. C10	180
Pittsburg,Calif. C11	194
Rankin,Pa. A7	175
S.Chicago,Ill. R2	175
SparrowsPt.,Md. B2	177
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	181

TIE WIRE, Automatic Baler (14½ Ga.(per 97 lb Net Box) Coil No. 3150

AlabamaCity,Ala. R2	$10.26
Atlanta A11	10.36
Bartonville,Ill. K4	10.36
Buffalo W12	10.26
Chicago W13	10.26
Crawfordsville,Ind. MS	10.36
Donora,Pa. A7	10.26
Duluth A7	10.26
Fairfield,Ala. T2	10.26
Houston S5	10.51
Jacksonville,Fla. MS	10.36
Johnstown,Pa. B2	10.26
Joliet,Ill. A7	10.26
KansasCity,Mo. S5	10.51
Kokomo,Ind. C16	10.36
LosAngeles B3	11.05
Minnequa,Colo. C10	10.51
Pittsburg,Calif. C11	11.04
S.Chicago,Ill. R2	10.26
S.SanFrancisco C10	11.04
SparrowsPt.,Md. B2	10.36
Sterling,Ill.(7) N15	10.36

Coil No. 6500 Stand.

AlabamaCity,Ala. R2	$10.60
Atlanta A11	10.70
Bartonville,Ill. K4	10.70
Buffalo W12	10.60
Chicago W13	10.60
Crawfordsville,Ind. MS	10.70
Donora,Pa. A7	10.60
Duluth A7	10.60
Fairfield,Ala. T2	10.60
Houston S5	10.85
Jacksonville,Fla. MS	10.70
Johnstown,Pa. B2	10.60
Joliet,Ill. A7	10.60
KansasCity,Mo. S5	10.85
Kokomo,Ind. C16	10.70
LosAngeles B3	11.40
Minnequa,Colo. C10	10.85
Pittsburg,Calif. C11	11.40
S.Chicago,Ill. R2	10.60
S.SanFrancisco C10	11.40
SparrowsPt.,Md. B2	10.70
Sterling,Ill.(37) N15	10.70

Coil No. 6500 Interim

AlabamaCity,Ala. R2	$10.65
Atlanta A11	10.75
Bartonville,Ill. K4	10.75
Buffalo W12	10.65
Chicago W13	10.65
Crawfordsville,Ind. MS	10.75
Donora,Pa. A7	10.65
Duluth A7	10.65
Fairfield,Ala. T2	10.65
Houston S5	10.90
Jacksonville,Fla. MS	10.75
Johnstown,Pa. B2	10.65
Joliet,Ill. A7	10.65
KansasCity,Mo. S5	10.90
Kokomo,Ind. C16	10.75
LosAngeles B3	11.45
Minnequa,Colo. C10	10.90
Pittsburg,Calif. C11	11.45
S.Chicago,Ill. R2	10.65
S.SanFrancisco C10	11.45
SparrowsPt.,Md. B2	10.75
Sterling,Ill.(37) N15	10.75

BALE TIES, Single Loop	**Col.**
AlabamaCity,Ala. R2	212
Atlanta A11	214
Bartonville,Ill. K4	214
Crawfordsville,Ind. MS	214
Donora,Pa. A7	212
Duluth A7	212
Fairfield,Ala. T2	212
Houston S5	217
Jacksonville,Fla. MS	214
Joliet,Ill. A7	212
KansasCity,Mo. S5	217
Kokomo,Ind. C16	214
Minnequa,Colo. C10	217
Pittsburg,Calif. C11	236
S.SanFrancisco C10	236
SparrowsPt.,Md. B2	214
Sterling,Ill.(7) N15	214

FENCE POSTS

Birmingham C15	172
ChicagoHts.,Ill. C2, I-2	172
Duluth A7	172
Franklin,Pa. F5	172
Huntington,W.Va. C15	172
Johnstown,Pa. B2	172
Marion,O. P11	172
Minnequa,Colo. C10	177
Sterling,Ill.(1) N15	172
Tonowanda,N.Y. B12	*172*

WIRE, Barbed	**Col.**
AlabamaCity,Ala. R2	193*†
Aliquippa,Pa. J5	190§
Atlanta A11	198*
Bartonville,Ill. K4	198
Crawfordsville,Ind. MS	198
Donora,Pa. A7	193†
Duluth A7	193†
Fairfield,Ala. T2	193‡
Houston S5	198**
Jacksonville,Fla. MS	198
Johnstown,Pa. B2	196§
Joliet,Ill. A7	193†
KansasCity,Mo. S5	198**
Kokomo,Ind. C16	195†
Minnequa,Colo. C10	198**
Monessen,Pa. P7	196§
Pittsburg,Calif. C11	213†
Rankin,Pa. A7	193†
S.Chicago,Ill. R2	193**
S.SanFrancisco C10	213*
SparrowsPoint,Md. B2	198§
Sterling,Ill.(7) N15	198††

WOVEN FENCE, 9-15 Ga.	**Col.**
Ala.City,Ala. R2	187*
Aliq'ppa,Pa.9-14½ga.J5	190§
Atlanta A11	192*
Bartonville,Ill. K4	192
Crawfordsville,Ind. MS	192
Donora,Pa. A7	187†
Duluth A7	187†
Fairfield,Ala. T2	187†
Houston S5	192**
Jacksonville,Fla. MS	192
Johnstown,Pa.(43) B2	190§
Joliet,Ill. A7	187†
KansasCity,Mo. S5	192**
Kokomo,Ind. C16	189†
Minnequa,Colo. C10	192**
Pittsburg,Calif. C11	210†
Rankin,Pa. A7	187†
S.Chicago,Ill. R2	187**
Sterling,Ill.(7) N15	192††

WIRE (16 gage)	**An'ld Stone**	**Galv. Stone**
Ala.City,Ala.R2	17.15	18.70**
Aliq'ppa,Pa. J5	17.15	18.95
Bartonville,Ill. K4	17.25	19.05
Cleveland A7	17.15	....
Craw'dsville MS	17.25	19.05
Fostoria,O. S1	17.65	19.20†
Houston S5	17.40	18.95**
Jacksonville MS	17.25	19.05
Johnstown B2	17.15	18.95§
Kan.City,Mo. S5	17.40	....
Kokomo C16	17.25	18.80†
Minnequa C10	17.40	18.95**
P'lm'r,Mass. W12	*18.15*	*19.70†*
Pitts.,Calif. C11	17.50	19.05†
SparrowsPt. B2	17.25	19.05§
Sterling(37)N15	17.25	19.05††
Waukegan A7	17.15	18.70†
Worcester A7	17.45	....

WIRE, Merchant Quality (6 to 8 gage)	**An'ld**	**Galv.**
Ala.City,Ala. R2	*9.00*	*9.55***
Aliquippa J5	8.65	9.325§
Atlanta(48) A11	8.75	9.425*
Bartonville(48) K4	8.75	9.425
Buffalo W12	*9.00*	*9.55†*
Cleveland A7	8.65	....
Crawfordsville MS	8.75	9.425
Donora,Pa. A7	8.65	9.20†
Duluth A7	8.65	9.20†
Fairfield T2	8.65	9.20†
Houston(48) S5	9.25	9.80**
Jacks'ville,Fla. MS	8.75	9.425
Johnstown B2(48)	8.65	9.325§
Joliet,Ill. A7	8.65	9.20†
Kans.City(48) S5	9.25	9.80**
Kokomo C16	8.75	9.30†
LosAngeles B3	9.60	10.275§
Minnequa C10	8.90	9.45**
Monessen P7(48)	8.65	9.325§
Palmer,Mass. W12	*9.30*	*9.85†*
Pitts.,Calif. C11	9.60	10.15†
Rankin,Pa. A7	8.65	9.20†
S.Chicago R2	*9.00*	*9.55***
S.SanFran. C10	9.60	10.15**
Spar'wsPt.B2(48)	8.75	9.425§
Sterling(48) N15	8.90	9.575††
Sterling(1) (48)	8.80	9.475††
Struthers,O. Y1	9.00	9.65‡
Worcester,Mass.A7	8.95	9.50†

Based on zinc price of: *13.50 †5c. §10c. ‡Less than 10c. ††10.50c. **Subject to zinc equalization extras.

FASTENERS

(Base discounts, full container quantity, per cent off list, f.o.b. mill)

BOLTS

Carriage, Machine Bolts

Full Size Body (cut thread)

½ in. and smaller:	
6 in. and shorter	49.0
Longer than 6 in.	39.0
⅝ in. thru 1 in.:	
6 in. and shorter	39.0
Longer than 6 in.	35.0
1⅛ in. and larger:	
All lengths	35.0

Undersized Body (rolled thread)

½ in. and smaller:	
6 in. and shorter	49.0

Carriage, Machine, Lag Bolts

Hot Galvanized:

½ in. and smaller:	
6 in. and shorter	29.0
Longer than 6 in.	15.0
⅝ in. and larger:	
All lengths	12.0

Lag Bolts (all diam.)	
6 in. and shorter	49.0
Longer than 6 in.	39.0
Plow and Tap Bolts	
½ in. and smaller by	
6 in. and shorter	49.0
Larger than ½ in. or longer than 6 in.	39.0
Blank Bolts	39.0
Step, Elevator, Tire Bolts	49.0

Stove Bolts, Slotted:

¼ to ¾ in. incl.,	
3 in. and shorter	55.0
⅞ to ½ in., inclusive	55.0

NUTS

Reg. & Heavy Square Nuts:	
All sizes	55.5
Square Nuts, Reg. & Heavy, Hot Galvanized:	
All sizes	41.0
Hex Nuts, Reg. & Heavy, Hot Pressed:	
¼ in. and smaller	60.5
⅝ in. to 1 in., incl.	55.5
1⅛ in. to 1½ in., incl.	58.5
1⅝ in. and larger	53.5
Hex Nuts, Reg. & Heavy, Cold Punched:	
¼ in. and smaller	60.5
⅝ in. to 1½ in., incl.	55.5
1⅝ in. and larger	53.5
Hex Nuts, All Types, Hot Galvanized:	
¼ in. and smaller	46.5
⅝ in. to 1 in., incl.	41.5
1⅛ in. to 1½ in., incl.	46.5
Hex Nuts, Semifinished, Heavy (Incl. Slotted):	
¾ in. and smaller	60.5
⅞ in. to 1½ in., incl.	55.5
1⅝ in. and larger	53.5
Hex Nuts, Finshed (Incl. Slotted and Castellated):	
1 in. and smaller	63.0
1⅛ in. to 1½ in., incl.	59.0
1⅝ in. and larger	53.5
Semifinished Hex Nuts, Reg. (Incl. Slotted):	
⅝ in. and smaller	60.5
¾ in. to 1 in., incl.	63.0
1⅛ in. to 1½ in., incl.	59.0
1⅝ in. and larger	53.5

CAP AND SETSCREWS

(Base discounts, packages, per cent off list, f.o.b. mill)

Hex Head Capscrews, Coarse or Fine Thread, Bright:	
6 in. and shorter:	
⅝ in. and smaller	40.0
¾, ⅞, and 1 in. diam.	22.0
Longer than 6 in.:	
⅝ in. and smaller	8.0
¾, ⅞, and 1 in. diam.	+ 6.0
High Carbon, Heat Treated:	
6 in. and shorter:	
⅝ in. and smaller	26.0
¾, ⅞, and 1 in. diam.	3.0
Longer than 6 in.:	
⅝ in. and smaller	+ 13.0
¾, ⅞, and 1 in. diam.	+ 32.0
Flat Head Capscrews:	
¾ in. and smaller	+ 76.0
Setscrews, Square Head, Cup Point, Coarse Thread:	
Through 1 in. diam.:	
6 in. and shorter	Net
Longer than 6 in.	+ 23

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great. Structural ½ in., larger 12.25

7/16 in. under: List less 19%

PRESTRESSED STRAND

(High strength, stress relieved; 7 wire uncoated. Net prices per 1000 ft, 40,000 lb and over)

	Strand Diameter, Inches				
	1/4	5/16	3/8	7/16	1/2
Alton,Ill. L1	$32.15	$48.20	$61.55	$81.10	$105.65
Buffalo W12	32.15	48.20	61.55	81.10	105.65
Cleveland A7	32.15	48.20	61.55	81.10	105.65
KansasCity,Mo. U3	32.15	48.20	61.55	81.10	105.65
Monessen,Pa. P6	32.15	48.20	61.55	81.10	105.65
NewHaven,Conn. A7	32.15	48.20	61.55	81.10	....
Pittsburg,Calif. C11	....	48.20	61.55	81.10	105.65
Pueblo,Colo. W12	32.15	48.20	61.55	81.10	105.65
Roebling,N.J. R5	32.15	48.20	61.55	81.10	105.65
St.Louis L8	32.15	48.20	61.55	81.10	105.65
Waukegan,Ill. A7	32.15	48.20	61.55	81.10	105.65

RAILWAY MATERIALS

	Standard No. 1	Standard No. 2	Tee Rails All No. 2	Tee Rails 60-lb Under
Rails				
Bessemer,Pa. U5	5.525	5.425	....	6.50
Ensley,Ala. T2	5.525	5.425	....	6.50
Fairfield,Ala. T2	....	....	....	....
Gary,Ind. U5	5.525	5.425	....	6.50
Huntington,W.Va. C15	....	....	....	....
IndianaHarbor,Ind. I-2	5.525	5.425	5.475	(16)6.50
Johnstown,Pa. B2	....	....	....	6.50
Lackawanna,N.Y. B2	5.525	5.425	....	7.00
Minnequa,Colo. C10	5.525	5.425	....	....
Steelton,Pa. B2	5.525	5.425	....	6.50
Williamsport,Pa. S19	....	....	....	....

TIE PLATES	
Fairfield,Ala. T2	6.60
Gary,Ind. U5	6.60
Ind.Harbor,Ind. I-2	6.60
Lackawanna,N.Y. B2	6.60
Minnequa,Colo. C10	6.60
Seattle B3	6.75
Steelton,Pa. B2	6.60
Torrance,Calif. C11	6.75

JOINT BARS	
Bessemer,Pa. U5	6.975
Fairfield,Ala. T2	6.975
Ind.Harbor,Ind. I-2	6.975
Joliet,Ill. U5	6.975
Lackawanna,N.Y. B2	6.975
Minnequa,Colo. C10	6.975
Steelton,Pa. B2	6.975

AXLES	
Ind.Harbor,Ind. S13	9.125
Johnstown,Pa. B2	9.125

TRACK BOLTS, Untreated	
Cleveland R2	14.75
KansasCity,Mo. S5	14.75
Lebanon,Pa. B2	14.75
Minnequa,Colo. C10	14.75
Pittsburgh P14	14.75
Seattle B3	15.25

SCREW SPIKES	
Lebanon,Pa. B2	14.50

STANDARD TRACK SPIKES	
Fairfield,Ala. T2	9.75
Ind.Harbor,Ind. I-2, Y1	10.10
KansasCity,Mo. S5	10.10
Lebanon,Pa. B2	9.75
Minnequa,Colo. C10	9.75
Pittsburgh J5	10.10
Seattle B3	10.25
S.Chicago,Ill. R2	10.10
Struthers,O. Y1	10.10
Youngstown R2	10.10

Footnotes

(1) Chicago base.
(2) Angles, flats, bands.
(3) Marchant.
(4) Reinforcing.
(5) 1¼ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in., 6.70c; 1 15/16 to 8 in., inclusive, 7.05c.
(6) Chicago or Birm. Base.
(7) Chicago base 2 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass. base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) ¾" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(21) New Haven,Conn. base.
(22) Deld. San Francisco Bay area.
(23) Special quality.
(24) Deduct 0.10c, finer than 15 Ga.
(25) Bar mill bands.
(26) Deld. in mill zone, 6.295c.
(27) Bar mill sizes.
(28) Bondevized.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝ in.; 7.975c, for widths ⅝ in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) Chicago base, 10 points lower.
(38) 14 Ga. & lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld. in mill zone or within switching limits, 5.685c.
(43) 9-14½ Ga.
(44) To fabricators.
(48) 6-7 Ga.
(49) 3½ in. and smaller rounds; 9.65c, over 3½ in. and other shapes.

Air Diffusers by TITUS

Music Wire by KEYSTONE

deliver quiet air!

Keystone Music Wire played an important part in the design and acceptance of these distinctive air diffusers produced by the Titus Manufacturing Corporation, Waterloo, Iowa.

Behind their modern surface plate is a surprisingly intricate louver design. Individual baffles control the air flow, and each baffle is held securely in position by a loop of Keystone Music Wire. Formerly, these louvers were riveted in position—a costly, time-consuming and precision process, since the louvers had to be held tightly enough to avoid annoying rattles, yet loosely enough to be easily changed or adjusted.

Keystone Music Wire solved the problem. It improved the appearance of the product, reduced production costs and permitted the widest possible range of adjustment. Since then, Titus has standardized on Keystone.

Why? A company official puts it this way: "We can't afford to take a chance on anything else. The wire must be of a uniform, high quality . . . perfect in every respect. We have never had a complaint about our diffusers that could be directed to Keystone Wire!"

If you want to make a good product better, contact your Keystone Representative. He will gladly work with you to determine how Keystone Wire can help.

Keystone Steel & Wire Company, Peoria 7, Illinois

KEYSTONE

WIRE FOR INDUSTRY

ACP ALODINE* — its properties and functions in protecting aluminum alloys and bonding paint to them

By ALFRED DOUTY: Technical Director, AMCHEM PRODUCTS, INC.

Aluminum protects itself against corrosion by a coating of its own oxide. This adds weight, but does not provide complete protection. Even commercially pure aluminum in clean air at ordinary room temperature oxidizes indefinitely.

The use of adherent inorganic protective coatings on aluminum has long been recognized as efficacious in reducing corrosion rate and prolonging paint life. Since aluminum oxide tends to be protective, it is natural that the most intensive early efforts in this direction should have involved processes for improving the properties of the naturally occurring oxide coating. Anodizing, or electrochemical oxidation, although it is one of the most effective of such methods, is rather costly and time consuming.

ALODINE†

Early in 1945 a new chemical process was devised for producing an amorphous phosphate coating on aluminum. Its simplicity, speed and economy and the unique properties of the coating have resulted in wide commercial acceptance. It is called the Alodine Process.

Some idea of the effectiveness of the Alodine coating on unpainted 3S Grade aluminum may be had from Fig. 1. All panels were removed from the salt spray cabinet after 300 hr. except the Alodized and anodized panels, which were continued to 800 hr.

Organic protective and decorative coatings, such as paint, likewise require a corrosion-retarding undercoating of the kind produced by Alodine to achieve their maximum life and adhesion.

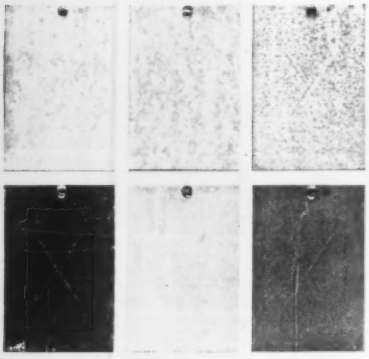


Fig. 1. Salt spray test comparison of Alodine with other surface treatments on unpainted aluminum. (Left to right, top row) solvent wiped—300 hr.; alkali cleaned—300 hr.; phosphate coated—300 hr. (Bottom row) chemically oxidized—300 hr.; anodically oxidized—800 hr.; Alodized—800 hr.

The effect of the Alodine coating in retarding underpaint corrosion is shown in Fig. 2. The Alodized panel was given a top coat only. All other panels in the series were primed after the surface treatments with a regular automotive product, baked, given a surface coat dry-scuffed with sandpaper as per standard automotive practice, and then finished with a regular black baked top coat. The panels were removed from the salt spray after failure of the paint film had set in.

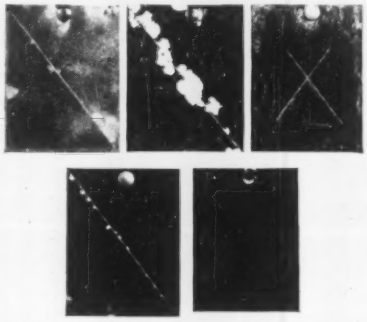


Fig. 2. Salt spray test comparison of Alodine with other surface treatments in retarding underpaint corrosion. (Left to right, top row) alkali cleaned and phosphoric acid dipped—300 hr.; phosphoric acid, solvent cleaned—300 hr.; zinc phosphate coated—400 hr. (Bottom row) anodically oxidized—3000 hr.; Alodized—3000 hr.

COATING CHARACTERISTICS

The coating produced by this new process is an amorphous metallic phosphate, dense, rather hard, and apparently nonporous. Unlike most oxide films, it is nonabsorptive and cannot be dyed or stained. Sealing in hot water or salts has no apparent effect. It differs markedly in appearance from previously known phosphate coatings, as shown in Fig. 3.

Electrical Resistance. Very little information is available at the present time on the electrical properties of the coating, but it is known that resistance increases very rapidly with thickness and as a result coatings normally produced offer extremely high resistance.

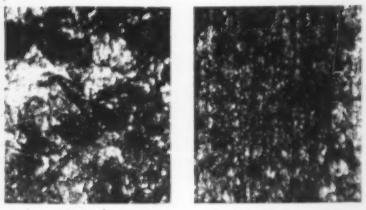


Fig. 3. (Left) conventional phosphate coating on aluminum; (right) Alodine coating produced in 3-min. immersion, rinsed and air dried. Magnification 500 diam.

Weight and thickness. Generally speaking, the weight of the amorphous phosphate coating increases with processing time, bath strength, and bath temperature. It is interesting to note that the increase becomes less and less pronounced as the temperature increases and actually reverses itself into a sharp decline between 130 and 140 F.

Adhesion. The original purpose in development of this process was to improve adhesion of the paint to aluminum surfaces and thus lengthen their overall life. Only later was it discovered that the film itself provides corrosion resistance.

Resistance to Bimetallic Corrosion. Since it has very high surface resistance, the coating, as would be expected, offers good resistance to bimetallic or galvanic corrosion. Test samples are available to illustrate the insulating effects.

We present here a general and by no means complete, report on ACP Alodine—its properties and uses in protecting aluminum alloys. Your ACP sales representative can give you a much fuller story. Or write us at Ambler.

*Alodine is a registered trademark of Amchem Products, Inc.

†Since the introduction of Alodine amorphous phosphate coatings, ACP has developed a complete line of Alodine amorphous chromate coatings for superior corrosion resistance.

Amchem Products, Inc. Ambler 19, Pa.

Formerly AMERICAN CHEMICAL PAINT COMPANY

CHEMICALS ACP PROCESSES

DETROIT, MICH. • ST. JOSEPH, MO.
NILES, CALIF. • WINDSOR, ONT.

New Chemical Horizons for Industry and Agriculture

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Alton, Ill. L1	....	....	....	....	....	....	0.25	+15	3.25	+11	6.75	+6.5	9.25	+5.75
Benwood, W. Va. W10	1.5	+25	+10.5	+34	+21	+42.5	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Butler, Pa. F6	4.5	+22	+8.5	+32	+19.5	+41	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Fairless, Pa. N3	....	....	....	....	....	....	0.25	+15	3.25	+11	6.75	+6.5	9.25	+5.75
Fontana, Calif. K1	....	....	....	....	....	....	+10.75	+26	+7.75	+22	+4.25	+17.5	+1.75	+16.75
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	1.25	+14	4.25	+10	7.75	+5.5	10.25	+6.25
Lorain, O. N3	....	....	....	....	....	....	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Sharon, Pa. S4	4.5	+22	+8.5	+32	+19.5	+41	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Sparrows Pt., Md. B2	0.5	+26	+11.5	+35	+22	+43.5	0.25	+15	3.25	+11	6.75	+6.5	9.25	+5.75
Wheatland, Pa. W9	4.5	+22	+8.5	+32	+19.5	+41	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Youngstown R2, Y1	....	....	....	....	....	....	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.73		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	....	....	....	....
Alton, Ill. L1	9.75	+4.75	10.25	+4.25	11.75	+4.5	11.75	+4.5	1.25	+15.5	1.25	+15.5
Benwood, W. Va. W10	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	3.25	+13.5	3.25	+13.5
Etna, Pa. N2	11.75	+2.75	13.25	+2.25	13.75	+2.5	13.75	+2.5	3.25	+13.5	3.25	+13.5
Fairless, Pa. N3	9.75	+4.75	10.25	+4.25	11.75	+4.5	11.75	+4.5	1.25	+15.5	1.25	+15.5
Fontana, Calif. K1	+1.25	+15.75	+0.75	+15.25	0.75	+15.5	0.75	+15.5	+9.75	+26.5	+9.75	+26.5
Indiana Harbor, Ind. Y1	10.75	+3.75	11.25	+3.25	12.75	+3.5	12.25	+3.5	2.25	+14.5	2.25	+14.5
Lorain, O. N3	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	....	....	....	....
Sharon, Pa. M6	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	....	....	....	....
Sparrows Pt., Md. B2	9.75	+4.75	10.25	+4.25	11.75	+4.5	11.75	+4.5	1.25	+15.5	1.25	+15.5
Wheatland, Pa. W9	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	3.25	+13.5	3.25	+13.5
Youngstown R2, Y1	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	3.25	+13.5	3.25	+13.5

ELECTRIC STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Youngstown R2	+12.25	+27.25	+5.75	+22.5	+3.25	+20	+1.75	+18.5	+1.75	+18.5	+2	+18.75	0.5	+16.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Alton, Ill. L1	....	....	....	....	....	....	0.25	+15	3.25	+11	6.75	+6.5	9.25	+5.75
Benwood, W. Va. W10	1.5	+25	+10.5	+34	+21	+42.5	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Butler, Pa. F6	4.5	+22	+8.5	+32	+19.5	+41	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Fairless, Pa. N3	....	....	....	....	....	....	0.25	+15	3.25	+11	6.75	+6.5	9.25	+5.75
Fontana, Calif. K1	....	....	....	....	....	....	+10.75	+26	+7.75	+22	+4.25	+17.5	+1.75	+16.75
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	1.25	+14	4.25	+10	7.75	+5.5	10.25	+6.25
Lorain, O. N3	....	....	....	....	....	....	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Sharon, Pa. S4	4.5	+22	+8.5	+32	+19.5	+41	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Sparrows Pt., Md. B2	0.5	+26	+11.5	+35	+22	+43.5	0.25	+15	3.25	+11	6.75	+6.5	9.25	+5.75
Wheatland, Pa. W9	4.5	+22	+8.5	+32	+19.5	+41	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Youngstown R2, Y1	....	....	....	....	....	....	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.73		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	....	....	....	....
Alton, Ill. L1	9.75	+4.75	10.25	+4.25	11.75	+4.5	11.75	+4.5	1.25	+15.5	1.25	+15.5
Benwood, W. Va. W10	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	3.25	+13.5	3.25	+13.5
Etna, Pa. N2	11.75	+2.75	13.25	+2.25	13.75	+2.5	13.75	+2.5	3.25	+13.5	3.25	+13.5
Fairless, Pa. N3	9.75	+4.75	10.25	+4.25	11.75	+4.5	11.75	+4.5	1.25	+15.5	1.25	+15.5
Fontana, Calif. K1	+1.25	+15.75	+0.75	+15.25	0.75	+15.5	0.75	+15.5	+9.75	+26.5	+9.75	+26.5
Indiana Harbor, Ind. Y1	10.75	+3.75	11.25	+3.25	12.75	+3.5	12.25	+3.5	2.25	+14.5	2.25	+14.5
Lorain, O. N3	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	....	....	....	....
Sharon, Pa. M6	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	....	....	....	....
Sparrows Pt., Md. B2	9.75	+4.75	10.25	+4.25	11.75	+4.5	11.75	+4.5	1.25	+15.5	1.25	+15.5
Wheatland, Pa. W9	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	3.25	+13.5	3.25	+13.5
Youngstown R2, Y1	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	3.25	+13.5	3.25	+13.5

*Galvanized pipe discounts based on current price of zinc (10.00c, East St. Louis).

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	Rerolling—Ingot	Rerolling—Slabs	Forging Billets	H.R. Strip	H.R. Rods; C.F. Wire	H.R. Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	22.00	27.00	....	36.00	40.00	42.00	39.25	48.50	45.00
202	23.75	30.25	36.50	39.00	40.75	43.00	40.00	49.25	49.25
301	23.25	28.00	37.25	37.25	42.00	44.25	41.25	51.25	47.50
302	25.25	31.50	38.00	40.50	42.75	45.00	42.25	52.00	52.00
302B	25.50	32.75	40.75	45.75	45.00	47.25	44.50	57.00	57.00
303	....	32.00	41.00	46.00	45.50	48.00	....	56.75	56.75
304	27.00	33.25	40.50	44.25	45.25	47.75	45.75	55.00	55.00
304L	....	....	48.25	51.50	53.00	55.50	53.50	63.25	62.75
305	28.50	36.75	42.50	47.50	45.25	47.75	46.25	58.75	58.75
308	30.75	38.25	47.25	50.25	52.75	55.75	55.25	63.00	63.00
309	39.75	49.50	57.75	64.50	63.75	67.00	66.00	80.50	80.50
310	49.75	61.50	78.00	84.25	86.50	91.00	87.75	96.75	96.75
314	....	....	77.50	....	86.50	91.00	87.75	99.00	104.25
316	39.75	49.50	62.25	69.25	69.25	73.00	71.75	80.75	80.75
316L	....	55.50	70.00	76.50	77.00	80.75	79.50	89.25	88.50
317	48.00	60.00	76.75	88.25	86.25	90.75	88.50	101.00	101.00
321	32.25	40.00	47.00	53.50	52.50	55.50	54.75	65.50	65.50
330	....	....	106.75	....	95.25	106.75	....	108.00	149.25
18-8 CbTa	37.00	46.50	55.75	63.50	61.50	64.75	....	79.25	79.25
403	....	....	28.25	....	32.00	33.75	30.00	40.25	40.25
405	19.50	25.50	29.75	36.00	33.50	35.25	32.50	46.75	46.75
410	16.75	21.50	28.25	31.00	32.00	33.75	30.00	40.25	40.25
416	....	....	28.75	....	32.50	34.25	....	48.25	48.25
420	26.00	33.50	34.25	41.75	39.25	41.25	40.25	52.00	62.00
430	17.00	21.75	28.75	32.00	32.50	34.25	31.00	40.75	40.75
430F	....	....	29.50	....	33.00	34.75	....	51.75	42.00
431	....	28.75	37.75	....	42.00	44.25	41.00	56.00	56.00
446	....	....	39.25	59.00	44.25	46.50	42.75	70.00	70.00

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; American Steel & Wire Div., U. S. Steel Corp.; Anchor Drawn Steel Co., division of Vanadium-Alloys Steel Co.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; A. M. Byers Co.; G. O. Carlson Inc.; Carpenter Steel Co.; Carpenter Steel Co. of New England; Charter Wire Products; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Firth Sterling Inc.; Fort Wayne Metals Inc.; Green River Steel Corp., subsidiary of Jessop Steel Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Ellwood Ivins Steel Tube Works Inc.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Stainless Steel Div., Jones & Laughlin Steel Corp.; Joslyn Stainless Steels, division of Joslyn Mfg. & Supply Co.; Latrobe Steel Co.; Lukens Steel Co.; Maryland Fine & Specialty Wire Co. Inc.; McLouth Steel Corp.; Metal Forming Corp.; Midvale-Heppenstall Co.; National Standard Co.; National Tube Div., U. S. Steel Corp.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Riverside-Alloy Metal Div., H. K. Porter Company Inc.; Rodney Metals Inc.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Standard Tube Co.; Superior Steel Div., Copperweld Steel Co.; Superior Tube Co.; Swepco Tube Corp.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co., subsidiary of Crucible Steel Co. of America; Tube Methods Inc.; Ulbrich Stainless Steels Inc.; U. S. Steel Corp.; Universal-Cyclops Steel Corp.; Vanadium-Alloys Steel Co.; Wall Tube & Metal Products Co.; Wallingford Steel Co., subsidiary of Allegheny Ludlum Steel Corp.; Washington Steel Corp.

Clad Steel

	Plates—Carbon Base 5%	10%	15%	20%	Sheets Carbon Base 20%
Stainless					
302	....	....	....	....	37.50
304	34.70	37.95	42.25	46.70	39.75
304L	36.90	40.55	45.10	49.85	....
316	40.35	44.50	49.50	54.50	58.25
316L	45.05	49.35	54.70	60.10	....
316 Cb	47.30	53.80	61.45	69.10	....
321	36.60	40.05	44.60	49.30	47.25
347	38.25	42.40	47.55	52.80	57.00
405	28.60	29.85	33.35	36.85	....
410	28.15	29.55	33.10	36.70	....
430	28.30	29.80	33.55	37.25	....
Inconel	48.00	59.55	70.15	80.85	....
Nickel	41.65	51.95	62.30	72.70	....
Nickel, Low Carbon	41.95	52.60	63.30	74.15	....
Monel	43.35	53.55	63.80	74.05	....
Copper*	....	....	....	....	46.00

	Strip, Carbon Base —Cold Rolled— 10%	Both Sides
Copper*	33.10	38.75

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, *Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4, and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Reg. Carbon (W-1)	0.330	W-Cr Hot Work (H-12)	0.530
Spec. Carbon (W-1)	0.385	V-Cr Hot Work (H-13)	0.550
Oil Hardening (O-1)	0.505	W Hot Wk. (H-21)	1.425-1.44
V-Cr-Hot Work (H-11)	0.505	Hi-Carbon-Cr (D-11)	0.955

Grade by Analysis (%) W	Cr	V	Co	Mo	AISI Designation	$ per lb
18	4	1	....	....	T-1	1.840
18	4	2	....	....	T-2	2.065
13.5	4	3	....	....	T-3	2.165
18.25	4.25	1	4.75	....	T-4	2.545
18	4	2	9	....	T-5	2.915
20.25	4.25	1.6	12.25	....	T-6	4.330
13.75	3.75	2	5	....	T-8	2.485
1.5	4	1	....	8.5	M-1	1.200
6.4	4.5	1.9	....	5	M-2	1.345
6	4	3	....	6	M-3	1.590

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, F2, J3, L3, M14, S8, U4, V2, and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate.

	Basic	No. 2 Foundry	Malle-able	Besse-mer
Birmingham District				
Birmingham R2	62.00	62.50‡	....	....
Birmingham U6	....	62.50‡	66.50	....
Woodward,Ala. W15	62.00**	62.50‡	66.50	....
Cincinnati, deld.	....	70.20	....	....
Buffalo District				
Buffalo H1, R2	66.00	66.50	67.00	67.50
N.Tonawanda,N.Y. T9	....	66.50	67.00	67.50
Tonawanda,N.Y. W12	66.00	66.50	67.00	67.50
Boston, deld.	77.29	77.79	78.29	....
Rochester,N.Y., deld.	69.02	69.52	70.02	....
Syracuse,N.Y., deld.	70.12	70.62	71.12	....
Chicago District				
Chicago I-3	66.00	66.50	66.50	67.00
S.Chicago,Ill. W14	66.00	66.50	66.50	67.00
S.Chicago,Ill. W14	66.00	....	66.50	67.00
Milwaukee, deld.	69.02	69.52	69.52	70.02
Muskegon,Mich., deld.	....	74.52	74.52	....
Cleveland District				
Cleveland R2, A7	66.00	66.50	66.50	67.00
Akron,Ohio, deld.	69.52	70.02	70.02	70.52
Mid-Atlantic District				
Birdsboro,Pa. B10	68.00	68.50	69.00	69.50
Chester,Pa. P4	68.00	68.50	69.00	....
Swedeland,Pa. A3	68.00	68.50	69.00	69.50
New York, deld.	....	75.50	76.00	....
Newark,N.J., deld.	72.69	73.19	73.69	74.19
Philadelphia, deld.	70.41	70.91	71.41	71.99
Troy,N.Y. R2	68.00	68.50	69.00	69.50
Pittsburgh District				
NevilleIsland,Pa. P6	66.00	66.50	66.50	67.00
Pittsburgh (N&S sides), Aliquippa, deld.	....	67.95	67.95	68.48
McKeesRocks,Pa., deld.	....	67.60	67.60	68.13
Lawrenceville,Homestead, Wilmerding,Monaca,Pa., deld.	....	68.26	68.26	68.79
Verona,Trafford,Pa., deld.	68.29	68.82	68.82	69.35
Brackenridge,Pa., deld.	68.60	69.10	69.10	69.63
Midland,Pa. C18	66.00	....	....	....
Youngstown District				
Hubbard,Ohio Y1	....	....	66.50	....
Sharpsville,Pa. S6	66.00	....	66.50	67.00
Youngstown Y1	....	....	66.50	67.00
Mansfield,Ohio, deld.	71.30	....	71.80	72.30
Duluth I-3	66.00	66.50	66.50	67.00
Erie,Pa. I-3	66.00	66.50	66.50	67.00
Everett,Mass. E1	67.50	68.00	68.50	....
Fontana,Calif. K1	73.00	73.50	....	....
Geneva,Utah C11	66.00	66.50	....	....
GraniteCity,Ill. G4	67.90	68.40	68.90	....
Ironton,Utah C11	66.00	66.50	....	....
Minnequa,Colo. C10	68.00	68.50	69.00	....
Rockwood,Tenn. T3	....	62.50‡	66.50	....
Toledo,Ohio I-3	66.00	66.50	66.50	67.00
Cincinnati, deld.	72.94	73.44	....	....

**Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.
‡Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.50.

PIG IRON DIFFERENTIALS

Silicon: Add 75 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.25% manganese over 1% or portion thereof.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1 for each 0.50% silicon or portion thereof over the base grade within a range of 6.50 to 11.50%; starting with silicon over 11.50% and $1.50 per ton for each 0.50% silicon or portion thereof up to 14%; add $1 for each 0.50% Mn over 1%)

Jackson,Ohio I-3, J1	$78.00
Buffalo H1	79.25

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1.25 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)	
CalvertCity,Ky. P15	$99.00
NiagaraFalls,N.Y. P15	99.00
Keokuk,Iowa Open-hearth & Fdry. $9 freight allowed K2	103.50
Keokuk,Iowa O.H. & Fdry. 12½ lb piglets, 16% Si, max fr'gt allowed up to $9, K2	106.50

LOW PHOSPHORUS PIG IRON, Gross Ton

Lyles,Tenn. T3 (Phos. 0.035% max)	$78.50
Rockwood,Tenn. T3 (Phos. 0.035% max)	78.50
Troy,N.Y. R2 (Phos. 0.035% max)	*73.00*
Philadelphia, deld.	*81.67*
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Erie,Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
NevilleIsland,Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	71.00

Steel Service Center Products

Representative prices, per pound, subject to extras, f.o.b. warehouse. City delivery charges are 15 cents per 100 lb except: Denver, Moline, Norfolk, Richmond, Washington, 20 cents; Baltimore, Boston, Los Angeles, New York, Philadelphia, Portland, Spokane, San Francisco, 10 cents; Atlanta, Birmingham, Chattanooga, Houston, Seattle, no charge.

	SHEETS				STRIP	BARS			Standard Structural Shapes	PLATES	
	Hot-Rolled	Cold-Rolled	Gal. 10 Ga.†	Stainless Type 302	Hot-Rolled*	H.R. Rounds	C.F. Rds.‡	H.R. Alloy 4140††[5]		Carbon	Floor
Atlanta	8.59§	9.86§	....	....	8.64	9.01	10.68	....	9.05	8.97	10.90
Baltimore	8.00	8.90	9.68	....	8.70	8.65	12.33#	15.18	8.50	8.65	9.75
Birmingham	8.18	9.45	10.46	....	8.23	8.60	10.57	....	8.64	8.56	10.70
Boston	9.38	10.44	11.45	53.50	9.42	9.73	12.90#	15.28	9.63	9.72	11.20
Buffalo	8.25	9.00	11.07	55.98	8.50	8.80	11.00#	15.00	8.90	8.90	10.45
Chattanooga	8.35	9.69	9.65	....	8.40	8.77	10.46	....	8.88	8.80	10.66
Chicago	8.20	9.45	10.10	53.00	8.23	8.60	8.80	14.65	8.64	8.56	9.88
Cincinnati	8.34	9.48	10.10	52.43	8.54	8.92	11.06	14.86	9.18	8.93	10.21
Cleveland	8.18	9.45	10.20	52.33	8.33	8.69	10.80#	14.74	9.01	8.79	10.11
Dallas	7.50	8.80	....	....	7.65	7.60	11.01	....	7.65	8.10	9.35
Denver	9.40	11.84	12.94	....	9.43	9.80	11.19	....	9.84	9.76	11.08
Detroit	8.43	9.70	10.45	56.50	8.58	8.90	9.15	14.91	9.18	8.91	10.13
Erie, Pa.	8.20	9.45	9.95[10]	....	8.50	8.75	9.05[10]	....	9.00	8.85	10.10
Houston	8.40	8.90	10.29	52.00	8.45	8.40	11.25	15.75	8.35	8.75	10.10
Jackson, Miss.	8.52	9.79	....	....	8.57	8.94	10.68	....	8.97	8.90	10.74
Los Angeles	8.25[2]	10.30[2]	11.90[2]	57.60	8.90	8.70[2]	12.10[2]	16.10	8.50[2]	8.65[2]	10.80[2]
Memphis, Tenn.	8.55	9.80	....	....	8.60	8.97	11.96#	....	9.01	8.93	10.56
Milwaukee	8.33	9.58	10.23	....	8.36	8.73	9.03	14.78	8.85	8.69	10.01
Moline, Ill.	8.55	9.80	10.45	....	8.58	8.95	9.15	....	8.99	8.91	....
New York	8.87	10.13	10.56	53.08	9.31	9.57	12.76#	15.09	9.35	9.43	10.66
Norfolk, Va.	8.40	....	....	....	9.10	9.10	12.00	....	9.40	8.85	10.35
Philadelphia	8.00	8.90	9.92	52.69	8.70	8.65	11.51#	15.01	8.50	8.75	9.75**
Pittsburgh	8.18	9.45	10.45	52.00	8.33	8.60	10.80#	14.65	8.64	8.56	9.88
Portland, Oreg.	8.50	11.20	11.55	57.38	9.55	8.65	14.50	15.95	8.65	8.30	11.50
Richmond, Va.	8.40	....	10.40	....	9.10	9.00	....	....	9.40	8.85	10.35
St. Louis	8.54	9.79	10.36	....	8.59	8.97	9.41	15.01	9.10	8.93	10.25
St. Paul	8.79	10.04	10.71	....	8.84	9.21	9.66	....	9.38	9.30	10.49
San Francisco	9.35	10.75	11.00	55.10	9.45‡‡	9.70	13.00	16.00	9.50	9.60	12.00
Seattle	9.95	11.15	12.20	57.38	10.00	10.10	14.05	16.35	9.80	9.70	12.10
South'ton, Conn.	9.07	10.33	10.71	....	9.48	9.74	....	....	9.57	9.57	10.91
Spokane	9.95	11.15	12.20	57.38	10.00	10.10	14.05	16.35	9.80	9.70	12.10
Washington	8.88	....	....	....	9.36	9.56	10.94	....	9.79	9.26	10.74

*Prices do not include gage extras; †prices include gage and coating extras; ‡includes 35-cent bar quality extras; §42 in. and under; **⅛ in. and heavier; ††as annealed; ‡‡¾ in. to 4 in. wide, inclusive; #1 in. round C-1018.

Base quantities, 2000 to 4999 lb except as noted; cold-rolled strip and cold-finished bars, 2000 lb and over except in Seattle, 2000 to 9999 lb; stainless sheets, 8000 lb except in Chicago, New York, Boston, Seattle, Portland, Oreg. 10,000 lb and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb, except in Portland, Oreg., 1000 to 9999 lb; [2]—30,000 lb; [5]—1000 to 1999 lb; [10]—2000 lb and over.

Refractories

Fire Clay Brick (per 1000)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Winburne, Snow Shoe, Pa., Bessemer, Ala., Farber, Mexico St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parrall, Portsmouth, Ohio, Ottawa, Ill., Stevens Pottery, Ga., $140; Salina, Pa., $145; Niles, Ohio, $138; Cutler, Utah, $165.

Super-Duty: Ironton, Ohio, Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Winburne, Snow Shoe, Pa., New Savage, Md., St. Louis, $185; Stevens Pottery, Ga., $195; Cutler, Utah, $233.

Silica Brick (per 1000)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Pt. Matilda, Pa., Portsmouth, Ohio, Hawstone, Pa., $158; Warren, Niles, Windham, Ohio, Hays, Latrobe, Morrisville, Pa., $163; E. Chicago, Ind., Joliet, Rockdale, Ill., $168; Lehigh, Utah, $175; Los Angeles, $180.

Super-Duty: Sproul, Hawstone, Pa., Niles, Warren, Windham, Ohio, Leslie, Md., Athens, Tex., $157; Morrisville, Hays, Latrobe, Pa., $168; E. Chicago, Ind., $167; Curtner, Calif., $182.

Semisilica Brick (per 1000)

Clearfield, Pa., $140; Philadelphia, $137; Woodbridge, N. J., $135.

Ladle Brick (per 1000)

Dry Pressed: Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Vanport, Pa., Mexico, Vandalia, Mo., Wellsville, Irondale, New Salisbury, Ohio, $96.75; Clearfield, Pa., Portsmouth, Ohio, $102.

High-Alumina Brick (per 1000)

50 Per Cent: St. Louis, Mexico, Vandalia, Mo., $235; Danville, Ill., $253; Philadelphia, Clearfield, Pa., $230; Orviston, Snow Shoe, Pa., $260.

60 Per Cent: St. Louis, Mexico, Vandalia, Mo., $295; Danville, Ill., $313; Clearfield, Orviston, Snow Shoe, Pa., $320; Philadelphia, $310.

70 Per Cent: St. Louis, Mexico, Vandalia, Mo., $335; Danville, Ill., $353; Clearfield, Orviston, Snow Shoe, Pa., $360; Philadelphia, $350.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, $188.

Nozzles (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, $310.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., $234.

Dolomite (per net ton)

Domestic, dead-burned, bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, Gibsonburg, Narlo, Ohio, $16.75; Thornton, McCook, Ill., $17; Dolly Siding, Bonne Terre, Mo., $15.60.

Magnesite (per net ton)

Domestic, dead-burned, ½ in. grains with fines: Chewelah, Wash., Luning, Nev., $46; ⅜ in. grains with fines: Baltimore, $73.

Fluorspar

Metallurgical grades, f.o.b. shipping point in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $37-$41; 70%, $36-$40; 60%, $33-$36.50. Imported, net tons, f.o.b. cars point of entry, duty paid, metallurgical grade: European, $29-$31, contract; Mexican, all rail, duty paid, $25; barge, Brownsville, Tex., $26.

Ores

Lake Superior Iron Ore

(Prices effective for the 1958 shipping season, gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Mesabi bessemer	$11.60
Mesabi nonbessemer	11.45
Old Range bessemer	11.85
Old Range nonbessemer	11.70
Open-hearth lump	12.70
High phos	11.45

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Jan. 30, 1957, and increases or decreases after that date are absorbed by the seller.

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

New Jersey, foundry and basic 62-64% concentrates	18.00-19.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 65%	25.00
N. African hematite (spot)	nom.
Brazilian iron ore, 68.5%	*17.60*

Tungsten Ore

Net ton, unit

Foreign wolframite, good commercial quality	$9.50-10.00
Domestic, concentrates f.o.b. milling points	17.00-22.00

*Before duty.

Manganese Ore

Mn 46-48%, Indian (export tax included), $1.10 per long ton unit, c.i.f. U. S. ports, duty for buyer's account; other than Indian, nominal; contracts by negotiation.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and Rhodesian	
48% 3:1	*$42.00-44.00*
48 %2.8:1	*38.00-40.00*
48% no ratio	*29.00-31.00*
South African Transvaal	
48% no ratio	*$29.00-31.00*
44% no ratio	*22.00-23.00*
Turkish	
48% 3:1	$51.00-55.00
Domestic	
Rail nearest seller	
18% 3:1	39.00

Molybdenum

Sulfide concentrate, per lb of Mo content, mines, unpacked	$1.23

Antimony Ore

Per short ton unit of Sb content, c.i.f. seaboard	
50-55%	$2.25-2.40
60-65%	2.50-3.10

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

Metal Powder

(Per pound f.o.b. shipping point in ton lots for minus 100 mesh, except as noted)

	Cents
Sponge Iron, Swedish: deld. east of Mississippi River, ocean bags 23,000 lb and over. F.o.b. Riverton or Camden, N. J., west of Mississippi River.	9.50
Sponge Iron, Domestic, 98 + % Fe: Deld. east of Mississippi River, 23,000 lb and over	10.50
Electrolytic Iron: Melting stock, 99.9% Fe, irregular fragments of ⅛ in. x 1.3 in.	28.00
Annealed, 99.5% Fe	36.50
Unannealed (99 + % Fe)	36.00
Unannealed (99 + % Fe) (minus 325 mesh)	59.00
Powder Flakes (minus 16, plus 100 mesh)	29.00
Carbonyl Iron: 98.1-99.9%, 3 to 20 microns, depending on grade, 93.00-290.00 in standard 200-lb containers; all minus 200 mesh.	
Aluminum: Atomized, 500-lb drum, freight allowed Carlots	39.50
Ton lots	41.50
Antimony, 500-lb lots	42.00*
Brass, 5000-lb lots	31.00-46.70†
Bronze, 5000-lb lots	47.20-51.50†
Copper: Electrolytic	14.75*
Reduced	14.75*
Lead	7.50*
Manganese: Minus 35 mesh	64.00
Minus 100 mesh	70.00
Minus 200 mesh	75.00
Nickel, unannealed	74.00
Nickel-Silver, 5000-lb lots	48.80-53.50†
Phosphor-Copper, 5000-lb lots	59.30
Copper (atomized) 5000-lb lots	39.80-48.30†
Silicon	47.50
Solder	7.00*
Stainless Steel, 304	$1.07
Stainless Steel, 316	$1.26
Tin	14.50*
Zinc, 5000-lb lots	17.50-30.70‡
Tungsten: Melting grade, 99% 60 to 200 mesh, nominal; 1000 lb and over	Dollars 3.15
Less than 1000 lb	3.30
Chromium, electrolytic 99.8% Cr min metallic basis	5.00

*Plus cost of metal. †Depending on composition. ‡Depending on mesh.

Electrodes

Threaded with nipple; unboxed, f.o.b. plant

GRAPHITE

Inches Diam	Length	Per 100 lb
2	24	$60.75
2½	30	39.25
3	40	37.00
4	40	35.00
5⅛	40	34.75
6	60	31.50
7	60	28.25
8, 9, 10	60	28.00
12	72	26.75
14	60	26.75
16	72	25.75
17	60	26.25
18	72	26.25
20	72	25.25
24	84	26.00

CARBON

8	60	13.30
10	60	13.00
12	60	12.95
14	60	12.85
14	72	11.95
17	60	11.85
17	72	11.40
20	84	11.40
20	90	11.00
24	72, 84	11.25
24	96	10.95
30	84	11.05
40, 35	110	10.70
40	100	10.70

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, Pa., furnace	$14.75-15.75
Connellsville, Pa., foundry	18.00-18.50

Oven Foundry Coke

Birmingham, ovens	$28.85
Cincinnati, deld.	31.84
Buffalo, ovens	30.50
Camden, N. J., ovens	29.50
Detroit, ovens	30.50
Pontiac, Mich., deld.	32.45
Saginaw, Mich., deld.	34.03
Erie, Pa., ovens	30.50
Everett, Mass., ovens: New England, deld.	31.55*
Indianapolis, ovens	29.75
Ironton, Ohio, ovens	29.00
Cincinnati, deld.	31.84
Kearny, N. J., ovens	29.75
Milwaukee, ovens	30.50
Neville Island (Pittsburgh), Pa., ovens	29.25
Painesville, Ohio, ovens	30.50
Cleveland, deld.	32.69
Philadelphia, ovens	29.50
St. Louis, ovens	31.50
St. Paul, ovens	29.75
Chicago, deld.	33.29
Swedeland, Pa., ovens	29.50
Terre Haute, Ind., ovens	29.75

*Or within $4.85 freight zone from works.

Coal Chemicals

Spot, cents per gallon, ovens

Pure benzene	36.00
Toluene, one deg	29.50
Industrial xylene	32.00-34.00

Per ton, bulk, ovens

Ammonium sulfate	$32.00-34.00

Cents per pound, producing point

Phenol: Grade 1, 17.50; Grade 2-3, 15.50; Grade 4, 17.50; Grade 5, 16.50; Grade 6, 14.50.	

Imported Steel

(Base per 100 lb, landed, duty paid, based on current ocean rates. Any increase in these rates is for buyer's account. Source of shipment: Western continental European countries.)

	North Atlantic	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305	$5.30	$5.30	$5.30	$5.50
Bar Size Angles	5.05	5.05	5.05	5.42
Structural Angles	5.05	5.05	5.05	5.42
I-Beams	5.11	5.11	5.11	5.45
Channels	5.11	5.11	5.11	5.45
Plates (basic bessemer)	6.62	6.62	6.62	6.94
Sheets, H.R.	8.20	8.20	8.20	8.50
Sheets, C.R. (drawing quality)	8.75	8.75	8.75	9.12
Furring Channels, C.R., 1000 ft, ¾ x 0.30 lb per ft	25.71	25.59	25.59	26.46
Barbed Wire (†)	6.65	6.65	6.65	7.00
Merchant Bars	6.07	6.07	6.07	6.43
Hot-Rolled Bands	7.15	7.15	7.15	7.55
Wire Rods, Thomas Commercial No. 5	6.50	6.50	6.50	6.90
Wire Rods, O.H. Cold Heading Quality No. 5	7.07	7.07	7.07	7.47
Bright Common Wire Nails (‡)	8.02	8.02	7.92	8.20

†Per 82 lb net reel. ‡Per 100-lb kegs, 20d nails and heavier.

Ferroalloys

MANGANESE ALLOYS

Spiegeleisen: Carlot, per gross ton, Palmerton, Neville Island, Pa. 21-23% Mn, $105; 19-21% Mn, 1-3% Si, $102.50; 16-19% Mn, $100.50.

Standard Ferromanganese: (Mn 74-76%, C 7% approx) base price per net ton, $245. Johnstown, Duquesne, Sheridan, Neville Island, Pa.; Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively. (Mn 79-81%). Lump $253 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

High-Grade Low-Carbon Ferromanganese: (Mn 85-90%). Carload, lump, bulk, max 0.07% C, 35.1c per lb of contained Mn, carload packed 36.4c, ton lots 37.9c, less ton 39.1c. Delivered. Deduct 1.5c for max 0.15% C grade from above prices, 3c for max 0.03% C, 3.5c for max 0.5% C, and 6.5c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk, 25.5c per lb of contained Mn, packed, carload 26.8c, ton lot 28.4c, less ton 29.6c. Delivered. Spot, add 0.25c.

Manganese Metal: 2" x D (Mn 95.5% min, Fe 2% max, Si 1% max, C 0.2%). Carload, lump, bulk, 45c per lb of metal; packed, 45.75c; ton lot 47.25c; less ton lot 49.25c. Delivered. Spot, add 2c.

Electrolytic Manganese Metal: Min carload, 34c; 2000 lb to min carload, 36c; less ton, 38c; 50 lb cans, add 0.5c per lb. Premium for hydrogen-removed metal, 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or any point east of Mississippi; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-68%). Carload, lump, bulk 1.50% C grade, 18-20% Si, 12.8c per lb of alloy. Packed, c.l. 14c, ton 14.45c, less ton 15.45c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. For 2% C grade, Si 15-17%, deduct 0.2% from above prices. For 3% C grade, Si 12-14.5%, deduct 0.4c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lot, 2" x D, $1.50 per lb of contained Ti; less ton $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lot $1.35, less ton $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract c.l. $240 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi River and north of Baltimore and St. Louis. Spot, $245.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4%). Contract c.l. $290 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed. Spot, $295.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l. lump, bulk 28.75c per lb of contained Cr; c.l. packed 30.30c, ton lot 32.05c; less ton 33.45c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: Cr 63-66% (Simplex), carload, lump, bulk, C 0.025% max, 36.75c per lb contained Cr; 0.010% max, 37.75c. Ton lot, add 3.5c; less ton, add 5.2c. Delivered.

Cr 67-71%, carload, lump, bulk, C 0.02% max, 41.00c per lb contained Cr; 0.025% max, 39.75c; 0.05% max, 39.00c; 0.10% max, 38.50c; 0.20% max, 38.25c; 0.50% max, 38.00c; 1.0% max, 37.75c; 1.5% max, 37.50c; 2.0% max, 37.25c. Ton lot, add 3.4c; less ton lot, add 5.1c. Delivered.

Foundry Ferrochrome, High-Carbon: (Cr 61-66%, C 5-7%, Si 7-10%). Contract, c.l., 2 in. x D, bulk 30.05c per lb of contained Cr. Packed, c.l. 31.65c, ton 33.45c, less ton 34.95c. Delivered. Spot, add 0.25c.

Foundry Ferrosilicon Chrome: (Cr 50-54%, Si 28-32%, C 1.25% max). Contract, carload packed, 8M x D, 21.25c per lb of alloy, ton lot 22.50c; less ton lot 23.70c. Delivered. Spot, add 0.25c.

Ferrochrome-Silicon: Cr 39-41%, Si 42-45%, C 0.05% max or Cr 33-36%, Si 45-48%, C 0.05% max. Carload, lump, bulk, 3" x down and 2" x down, 27.50c per lb contained Cr, 14.20c per lb contained Si. 0.75" x down, 28.65c per lb contained Cr, 14.20c per lb contained Si. Delivered.

Chromium Metal, Electrolytic: Commercial grade (Cr 99.8% min, metallic basis, Fe 0.2% max). Contract, carlot, packed 2" x D plate (about ⅛" thick) $1.29 per lb, ton lot $1.31, less ton lot $1.33. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth grade (V 50-55%, Si 8% max, C 3% max). Contract, any quantity, $3.20 per lb of contained V. Delivered. Spot, add 10c. **Special Grade:** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.30. **High Speed Grade:** (V 50-55%, or 70-75%, Si 1.50% max, C 0.20% max) $3.40.

Grainal: Vanadium Grainal No. 1 $1.05 per lb; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract less carload lot, packed, $1.38 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

50% Ferrosilicon: Contract, carload, lump, bulk, 14.20c per lb of contained Si. Packed c.l. 16.70c, ton lot 18.15c, less ton 19.80c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.45c to 50% ferrosilicon prices.

65% Ferrosilicon: Contract, carload, lump, bulk, 15.25c per lb contained silicon. Packed, c.l. 17.25c, ton lot 19.05c, less ton 20.4c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Contract, carload, lump, bulk, 16.4c per lb of contained Si. Packed, c.l. 18.30c, ton lot 19.95c, less ton 21.2c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Contract, carload, lump, bulk, 19.5c per lb of contained Si. Packed, c.l. 21.15c, ton lot 22.55c, less ton 23.6c. Delivered. Spot, add 0.25c.

Silicon Metal: (98% min Si, 1.00% max Fe, 0.07% max Ca). C.l. lump, bulk, 21.00c per lb of Si. Packed, c.l. 22.65c, ton lot 23.95c, less ton 24.95c. Add 0.5c for max 0.03% Ca grade. Add 0.5c for 0.50% Fe grade analyzing min 98.25% min Si.

Alsifer: (Approx 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 9.60c per lb of alloy; ton lot, packed, 10.95c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l. lump, bulk, 9.25c per lb of alloy. Packed, c.l. 10.45c, ton lot 11.6c, less ton 12.45c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Contract, carload, lump, packed 27.25c per lb of alloy, ton lot 28.4c, less ton 29.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices, 100 lb and over are as follows: Grade A (10-14% B) 85c per lb; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). Carload, bulk, lump, or 3" x D, $5.25 per lb of contained B. Packed, carload $5.40, ton to c.l. $5.50, less ton $5.60. Delivered.

Carbortam: (B 1 to 2%). Contract, lump, carload $320 per ton, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload, lump, bulk 23c per lb of alloy, carload packed 24.25c, ton lot 26.15c, less ton 27.15c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.5-3%). Contract, carload, lump, bulk 24c per lb of alloy, carload packed 25.65c, ton lot 27.95c, less ton 29.45c. Delivered. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx 3⅜ lb each and containing 2 lb of Cr). Contract, carload, bulk 19.60c per lb of briquet, carload packed in box pallets 19.80c, in bags 20.70c; 3000 lb to c.l. in box pallets 21.00c; 2000 lb to c.l. in bags 21.90c; less than 2000 lb in bags 22.80c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx 3 lb and containing 2 lb of Mn). Contract, carload, bulk 14.8c per lb of briquet; c.l., packed, pallets 15c, bags 16c; 3000 lb to c.l., pallets 16.2c; 2000 lb to c.l., bags, 17.2c; less ton 18.1c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx 3½ lb, and containing 2 lb of Mn and approx ½ lb of Si). Contract, c.l. bulk 15.1c per lb of briquet; c.l. packed, pallets, 15.3c; bags 16.3c, 3000 lb to c.l., pallets, 16.5c; 2000 lb to c.l., bags 17.5c; less ton 18.4c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx 5 lb and containing 2 lb of Si). Contract, carload bulk 7.7c per lb of briquet; packed, pallets, 7.9c; bags 8.9c; 3000 lb to c.l., pallets 9.5c; 2000 lb to c.l., bags 10.5c; less ton 11.4c. Delivered. Spot, add 0.25c. (Small size—weighing approx 2½ lb and containing 1 lb of Si). Carload, bulk 7.85c. Packed, pallets 8.05c; bags 9.05c; 3000 lb to c.l., pallets 9.85c; 2000 lb to c.l., bags, 10.65c; less ton 11.55c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each). $1.41 per pound of Mo contained, f.o.b. Langeloth, Pa.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%), 5000 lb W or more $2.15 per lb (nominal) of contained W. Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 8% max, C 0.4% max). Ton lots 2" x D, $4 per lb of contained Cb; less ton lots, $4.05 (nominal). Delivered.

Ferrotantalum Columbium: (Cb 40% approx, Ta 20% approx, and Cb plus Ta 60% min, C 0.30% max). Ton lot 2" x D, $3.80 per lb of contained Cb plus Ta, delivered; less ton lot $3.85 (nominal).

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx). Contract, c.l. packed ½-in. x 12 M 20.00c per lb of alloy, ton lot 21.15c, less ton 22.40c. Delivered. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 20c per lb of alloy, ton lot 21.15c; less ton lot 22.4c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 18.45c per lb of alloy; ton lot 19.95c; less ton lot 21.20c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

Simanal: (Approx 20% each Si, Mn, Al; bal Fe). Lump, carload, bulk 19.25c. Packed c.l. 20.25c, 2000 lb to c.l. 21.25c; less than 2000 lb 21.75c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $5 for each 1% of P above or below the base); carload, bulk, f.o.b. sellers' works, Mt. Pleasant, Siglo, Tenn., $120 per gross ton.

Ferromolybdenum: (55-75%). Per lb of contained Mo, in 200-lb container, f.o.b. Langeloth and Washington, Pa. $1.68 in all sizes except powdered which is $1.74.

Technical Molybdic-Oxide: Per lb of contained Mo, in cans, $1.39; in bags, $1.38, f.o.b. Langeloth and Washington, Pa.

(*Concluded from Page 124*)

tute, Philadelphia, through George K. Heebner Inc., to Camden Iron Works, Camden, N. J.

100 tons, school structure, Juneau, Alaska; bids Aug. 20.

STRUCTURAL STEEL PENDING

3400 tons, 12-story addition, Fox Department Store, Hartford, Conn.; taking estimates.

1202 tons, state bridge work, Montgomery County, Pa.; bids Aug. 29.

600 tons, shapes and joists, high school, Greencastle, Franklin County, Pa.; pending.

450 tons, four state bridges, Worcester Expressway, Worcester, Mass.; bids Aug. 26, Boston; also 120 tons, concrete reinforcing bars in structures.

380 tons, state bridge work, Pennsylvania, bids Aug. 15; work comprises 290 tons for a bridge in Delaware County and 90 tons for another in Perry County.

365 tons, bridge, Interstate over Stillwater Avenue, Bangor, Maine; bids Aug. 27, Augusta, Maine.

260 tons, including 105 tons, reinforcing bars, Armstrong Road bridge, Waterville-Oakland, Maine; bids in Aug. 20.

290 tons, state bridge, Delaware County, Pennsylvania; J. J. Shelly, Media, Pa., low on general contract.

255 tons, Armstrong Road bridge, Oakland-Waterville, Maine; bids Aug. 20, Augusta, Maine.

207 tons, state bridge work, Monroe-Northampton Counties, Pa.; bids Aug. 29.

180 tons, including 50 tons, reinforcing bars, Lyons Road bridge, Sidney, Maine.

175 tons, four highway bridges, North Smithfield (R. I.) Expressway; also 420 tons, concrete reinfrocing bars.

167 tons, state bridge work, Armstrong County, Pa.; bids Aug. 29; 86 tons of reinforcing steel also required.

165 tons, including 45 tons, reinforcing bars, Trafton Road bridge, Waterville, Maine; Cianchette Bros. Inc., Pittsfield, Me., general contractor.

160 tons, state highway bridges, Bernardston, Mass.; Suburban Excavators Inc., Wakefield, Mass., low, general contract.

150 tons, addition to Seattle-Tacoma airport; James I. Barnes Construction Co., Seattle, low on general contract.

130 tons, Lyons Road bridge, Sidney, Maine; bids Aug. 20, Augusta, Maine.

110 tons, state highway bridge, including reinforcing bars, Augusta, Maine.

105 tons, 3-span composite WF beam bridge, Coventry-Newport, Vt.; also 35 tons, reinforcing bars.

REINFORCING BARS . . .

REINFORCING BARS PLACED

875 tons, Washington State University crossing piers, to Bethlehem Pacific Coast Steel Corp., Seattle; general contract to Scheumann & Johnson, Seattle, low $964,291.

630 tons, state highway structures, Tewksbury-Wilmington-Andover, Mass., to Northern Steel Inc., Boston; Bayer & Mingolla Construction Co., Worcester, Mass., general contractor.

100 tons, Bellevue, Wash., school to Northwest Steel Rolling Mills Inc., Seattle; George E. Teufel, Seattle, general contractor.

REINFORCING BARS PENDING

8000 tons, powerhouse, Ice Harbor lock and dam, Walla Walla-Franklin Counties, Washington; bids about Sept. 15, Corps of Engineers, Walla Walla, Wash.

1518 tons, state bridge work, Philadelphia County, Pa.; bids Aug. 29.

987 tons, state bridge work, Erie County, Pa.; bids Aug. 29.

875 tons, Washington State freeway bridge, Seattle; Scheumann & Johnson, Seattle, low $964,291 and awarded general contract for seven main piers.

715 tons, state bridge work, Montgomery County, Pa.; bids Aug. 29.

835 tons, caisson, pumping station substructure, Deer Island, Boston; also 125 tons of structural steel and 175 tons of wrought iron linings and suction fittings; bids to Metropolitan District Commission, Boston.

452 tons, state bridge work, Monroe-Northampton Counties, Pa.; bids Aug. 29.

185 tons, two Montana state highway bridges, Mineral County; bids to Helena, Aug. 27; also 50 tons of reinforcing and an unstated tonnage of piling, Yellowstone River bridge.

179 tons, addition to Franklin High School, Seattle; James I. Barnes Construction Co., Seattle, general contractor.

140 tons, 587-ft deck girder bridge, Canterbury-Boscawen, N. H.; also 450 tons, steel bearing piles.

129 tons, state bridge work, Warren County, Pa.; bids Aug. 29.

135 tons, including structurals, bridge and drainage structures, Concord, N. H.

125 tons, laterals, drains, etc., near Vantage, Wash.; bids to Bureau of Reclamation, Ephrata, Wash., Sept. 18.

115 tons, state highway structures, Grantham, N. H.

120 tons, highway mesh, North Haven, Conn.

100 tons, including trash racks, etc., Ashland Diversion Canal, Rogue River project, Oregon; bids to Bureau of Reclamation, Camp White, Oreg.; Aug. 28; Spec. IC-5084.

100 tons, state highway bridge, Ferrisburg, Vt.

100 tons, state bridge work, Lackawanna County, Pa.; bids Aug. 29.

PLATES . . .

PLATES PLACED

2000 tons, state highway structures, Elmsford Sec., Cross Westchester Expressway, New York, to Capitol Steel Co., that city; Mount Vernon Contracting Co., Mt. Vernon, N. Y., general contractor.

300 tons, brewery tanks and other industrial projects, to Puget Sound Fabricators Inc., Seattle.

PLATES PENDING

567 tons, high tensile, Navy purchasing office, Washington; bids Sept. 9; also 75 tons, medium tensile, grade M., Aug. 26.

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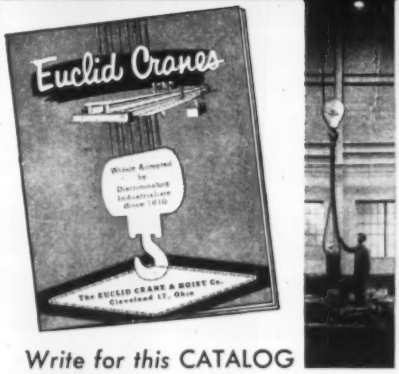

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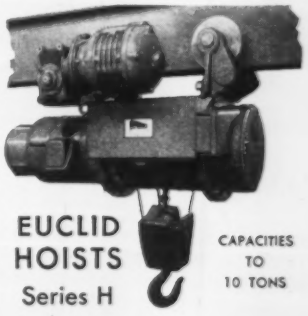

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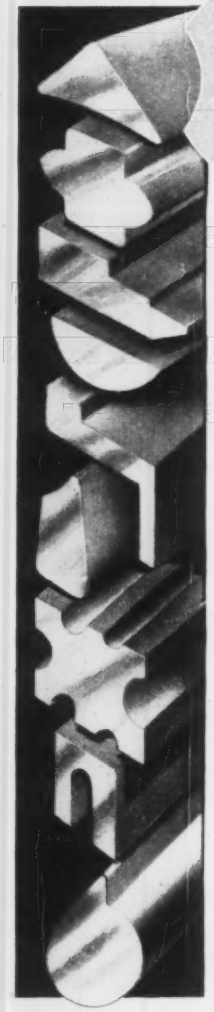

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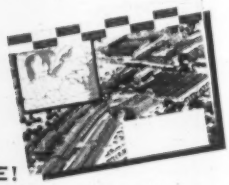

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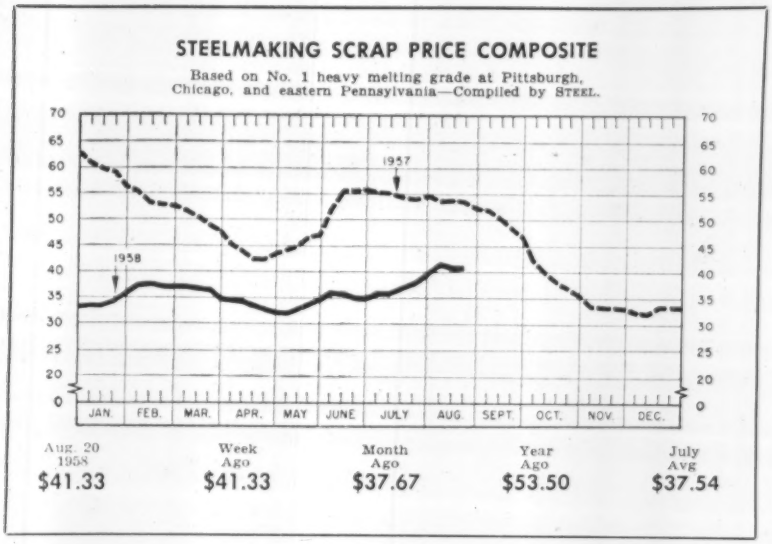
STEELMAKING SCRAP PRICE COMPOSITE
Based on No. 1 heavy melting grade at Pittsburgh, Chicago, and eastern Pennsylvania—Compiled by STEEL.
1957
1958
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.
Aug. 20 1958 $41.33
Week Ago $41.33
Month Ago $37.67
Year Ago $53.50
July Avg $37.54

Scrap Market Is Slow

Current price levels are meeting resistance. Steel mills haven't made any substantial purchases despite slow rise in operations. STEEL's composite holds at $41.33

Scrap Prices, Page 140

Pittsburgh—Trade is at a standstill and interest seems to be at a new low. Major consumers indicate they'll do no more buying this month. The market may be softer, but brokers could buy little scrap at the prices mills are willing to pay. Under no pressure to sell, the dealers remain optimistic. They expect higher steelmaking operations to strengthen scrap demand in September.

Chicago — With important steel mills out of the market, scrap prices are essentially unchanged. Market observers believe the situation will continue until after Labor Day. Lack of buying has turned the recent bullish market to a bearish one.

The market has also been influenced by the growing threat of a strike in the automotive industry in September or October. A strike would quickly halt the upward trend in steelmaking, causing a deep cut in scrap consumption.

Philadelphia — Prices have advanced slightly on three grades of scrap: Electric furnace bundles to $39-$40, delivered; short shovel turnings to $23-$24; and machine shop turnings to $20-$21. All other grades are unchanged. In general, the market is on a fairly even keel with neither buyers nor sellers showing much interest at present.

New York—Prices of major open hearth grades are steady, but brokers have raised quotations on turnings, 18-8 sheets, clips and solids. Machine shop turnings are higher at $10-$11, mixed borings and turnings at $11-$12, and short shovel turnings at $13-$14. Stainless (18-8) sheets, clips, and solids are up $10 a ton to $175-$180. Cast iron grades are unchanged.

Cleveland—Prices held steady for the second week. There's little activity in this area and in the Valley, but the market is firm because of a constant rise in steel operations. Production is expected to rise again in September, unless auto plants are closed by a strike. The situation will exert more upward pressure on prices early next month, market sources say.

Youngstown — The steam has gone out of this district's iron and steel scrap market. Although prices paid by mills are unchanged, certain brokers are offering less money and apparently are getting some scrap. Forecasts are for a prolonged auto strike, which will depress steelmaking operations—currently, the local industry has a somewhat firmer tone than it had.

Operations here are off 4 points from the week before, but that is due to a suspension of steelmaking at Youngstown Sheet & Tube Co.'s Brier Hill Works during the electrification of its blooming mill—it was powered with a steam engine.

Detroit — Scrap prices continue to be soft in the absence of any substantial buying by mills. Brokers and dealers feel the market will stabilize when the next auto lists come out. (They are expected to involve small tonnages which may make for quick buying.) Some shipments are still being made off the docks to Canadian mills.

Buffalo—The local market was quiet last week, although the undertone remained firm. New mill business has not been of sufficient volume to lift prices to higher levels. One mill brought a limited tonnage of No. 2 grades at $1 higher than prevailing prices.

The market for No. 1 heavy melting continues nominally in the $34 to $35 range. There has been virtually no business in the No. 1 grade this month—its consumers seem to be resisting higher prices.

Cincinnati—No new buying has been done to provide a price test, and a stalemate between consumers and dealers has developed. Consumers are showing marked resistance to recent advances; dealers are just selling what they have to, believing even higher prices are ahead.

St. Louis—The local market is steady, following a bullish period in which a lot of momentum developed. Caution prevails now, based primarily on a possible strike in the automotive industry.

Birmingham—With sizable stockpiles, mills in this district are continuing to resist dealers' efforts to force higher prices. Most dealers, although they have accumulated good inventories of all grades but cast, are offering sparingly at present levels and larger tonnages at several dollars above the market.

Houston—The leading local mill entered the market last Monday for a limited tonnage of scrap.

(*Please turn to Page* 145)

Iron and Steel Scrap

Consumer prices per gross ton, except as otherwise noted, including brokers' commission, as reported to STEEL, Aug. 20, 1958. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Aug. 20	$41.33
Aug. 13	41.33
July Avg.	37.54
Aug. 1957	53.33
Aug. 1953	43.40

Based on No. 1 heavy melting grade at Pittsburgh, Chicago, and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	42.00-43.00
No. 2 heavy melting	35.00-36.00
No. 1 dealer bundles	42.00-43.00
No. 2 bundles	31.00-32.00
No. 1 busheling	42.00-43.00
No. 1 factory bundles	49.00-50.00
Machine shop turnings	20.00-21.00
Mixed borings, turnings	20.00-21.00
Short shovel turnings	24.00-25.00
Cast iron borings	24.00-25.00
Cut structurals:	
2 ft and under	47.00-48.00
3 ft lengths	46.00-47.00
Heavy turnings	41.00-42.00
Punchings & plate scrap	49.00-50.00
Electric furnace bundles	49.00-50.00

Cast Iron Grades

No. 1 cupola	43.00-44.00
Stove plate	41.00-42.00
Unstripped motor blocks	23.00-24.00
Clean auto cast	39.00-40.00
Drop broken machinery	51.00-52.00

Railroad Scrap

No. 1 R.R. heavy melt.	49.00-50.00
Rails, 2 ft and under	57.00-58.00
Rails, 18 in. and under	58.00-59.00
Random rails	54.00-55.00
Railroad specialties	52.00-53.00
Angles, splice bars	53.00-54.00
Rails, rerolling	58.00-59.00

Stainless Steel Scrap

18-8 bundles & solids	*195.00-200.00*
18-8 turnings	*115.00-120.00*
430 bundles & solids	*110.00-115.00*
430 turnings	50.00-52.00

CHICAGO

No. 1 hvy melt, indus.	44.00-45.00
No. 1 hvy melt., dealer	42.00-43.00
No. 2 heavy melting	36.00-37.00
No. 1 factory bundles	48.00-49.00
No. 1 dealer bundles	42.00-43.00
No. 2 bundles	29.00-30.00
No. 1 busheling, indus.	44.00-45.00
No. 1 busheling, dealer	42.00-43.00
Machine shop turnings	21.00-22.00
Mixed borings, turnings	23.00-24.00
Short shovel turnings	23.00-24.00
Cast iron borings	23.00-24.00
Cut structurals, 3 ft	48.00-49.00
Punchings & plate scrap	49.00-50.00

Cast Iron Grades

No. 1 cupola	45.00-46.00
Stove plate	43.00-44.00
Unstripped motor blocks	36.00-37.00
Clean auto cast	51.00-52.00
Drop broken machinery	51.00-52.00

Railroad Scrap

No. 1 R.R. heavy melt.	48.00-49.00
R.R. malleable	57.00-58.00
Rails, 2 ft and under	60.00-61.00
Rails, 18 in. and under	61.00-62.00
Angles, splice bars	55.00-56.00
Axles	67.00-68.00
Rails, rerolling	64.00-65.00

Stainless Steel Scrap

18-8 bundles & solids	*205.00-210.00*
18-8 turnings	105.00-110.00
430 bundles & solids	105.00-110.00
430 turnings	60.00-65.00

YOUNGSTOWN

No. 1 heavy melting	43.00-44.00
No. 2 heavy melting	30.00-31.00†
No. 1 busheling	43.00-44.00
No. 1 bundles	43.00-44.00
No. 2 bundles	30.00-31.00†
Machine shop turnings	15.00-16.00†
Short shovel turnings	20.00-21.00
Cast iron borings	20.00-21.00
Low phos.	45.00-46.00
Electric furnace bundles	45.00-46.00

Railroad Scrap

No. 1 R.R. heavy melt.	47.00-48.00†

CLEVELAND

No. 1 heavy melting	39.50-40.50
No. 2 heavy melting	26.00-27.00
No. 1 factory bundles	46.00-47.00
No. 1 bundles	39.50-40.50
No. 2 bundles	28.00-29.00
No. 1 busheling	39.50-40.50
Machine shop turnings	14.00-15.00
Short shovel turnings	19.00-20.00
Mixed borings, turnings	19.00-20.00
Cast iron borings	19.00-20.00
Cut foundry steel	41.00-42.00
Cut structurals, plates 2 ft and under	49.00-50.00
Low phos. punchings & plate	41.00-42.00
Alloy free, short shovel turnings	22.00-23.00
Electric furnace bundles	40.50-41.50

Cast Iron Grades

No. 1 cupola	44.00-45.00
Charging box cast	37.00-38.00
Heavy breakable cast	36.00-37.00
Stove plate	46.00-47.00
Unstripped motor blocks	32.00-33.00
Brake shoes	36.00-37.00
Clean auto cast	49.00-50.00
Burnt cast	33.00-34.00
Drop broken machinery	49.00-50.00

Railroad Scrap

R.R. malleable	60.00-61.00
Rails, 2 ft and under	57.00-58.00
Rails, 18 in. and under	58.00-59.00
Rails, random lengths	52.00-53.00
Cast steel	49.00-50.00
Railroad specialties	50.00-51.00
Uncut tires	43.00-44.00
Angles, splice bars	50.00-51.00
Rails, rerolling	56.00-57.00

Stainless Steel

(Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	185.00-190.00
18-8 turnings	100.00-105.00
430 clips, bundles, solids	90.00-100.00
430 turnings	40.00-50.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	39.00
No. 2 heavy melting	37.00
No. 1 bundles	41.00
No. 2 bundles	30.00
No. 1 busheling	41.00
Machine shop turnings	20.00†
Short shovel turnings	22.00†

Cast Iron Grades

No. 1 cupola	48.00
Charging box cast	*40.00*
Heavy breakable cast	*39.00*
Unstripped motor blocks	39.00
Clean auto cast	48.00
Stove plate	45.50

Railroad Scrap

No. 1 R.R. heavy melt.	*44.00*
Rails, 18 in. and under	52.00
Rails, random lengths	48.00
Rails, rerolling	61.00
Angles, splice bars	47.00

BIRMINGHAM

No. 1 heavy melting	35.00-36.00*
No. 2 heavy melting	30.00-31.00*
No. 1 bundles	35.00-36.00*
No. 2 bundles	*24.00-25.00*
No. 1 busheling	35.00-36.00*
Cast iron borings	12.00-13.00
Machine shop turnings	21.00-22.00
Short shovel turnings	22.00-23.00
Bars, crops and plates	*46.00-47.00*
Structurals & plates	*45.00-46.00*
Electric furnace bundles	39.00-40.00
Electric furnace:	
2 ft and under	38.00-39.00
3 ft and under	37.00-38.00

Cast Iron Grades

No. 1 cupola	*54.00-55.00*
Stove plate	*54.00-55.00*
Unstripped motor blocks	41.00-42.00
Charging box cast	22.00-23.00
No. 1 wheels	39.00-40.00

Railroad Scrap

No. 1 R.R. heavy melt.	39.00-40.00
Rails, 18 in. and under	*51.00-52.00*
Rails, rerolling	59.00-60.00
Rails, random lengths	45.00-46.00
Angles, splice bars	*47.00-48.00*

PHILADELPHIA

No. 1 heavy melting	38.00
No. 2 heavy melting	34.00
No. 1 bundles	38.00
No. 2 bundles	25.00†
No. 1 busheling	38.00
Electric furnace bundles	*39.00-40.00*
Mixed borings, turnings	19.00
Short shovel turnings	*23.00-24.00*
Machine shop turnings	*20.00-21.00*
Heavy turnings	33.00
Structurals & plates	42.00-43.00
Couplers, springs, wheels	45.50
Rail crops, 2 ft & under	57.00-58.00*

Cast Iron Grades

No. 1 cupola	40.00
Heavy breakable cast	42.00
Malleable	58.00-59.00
Drop broken machinery	48.00-50.00

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	32.00-33.00
No. 2 heavy melting	29.00
No. 1 bundles	32.00-33.00
No. 2 bundles	19.00-20.00
Machine shop turnings	*10.00-11.00*
Mixed borings, turnings	*11.00-12.00*
Short shovel turnings	*13.00-14.00*
Low phos (structurals & plates)	35.00-36.00

Cast Iron Grades

No. 1 cupola	35.00-36.00
Unstripped motor blocks	27.00-28.00
Heavy breakable	33.00-34.00

Stainless Steel

18-8 sheets, clips, solids	*175.00-180.00*
18-8 borings, turnings	60.00-65.00
410 sheets, clips, solids	50.00-55.00
430 sheets, clips, solids	60.00-65.00

BUFFALO

No. 1 heavy melting	34.00-35.00
No. 2 heavy melting	29.00-30.00
No. 1 bundles	34.00-35.00
No. 2 bundles	27.00-28.00
No. 1 busheling	34.00-35.00
Mixed borings, turnings	17.00-18.00
Machine shop turnings	14.00-15.00
Short shovel turnings	19.00-20.00
Cast iron borings	17.00-18.00
Low phos. structurals and plate, 5 ft and under	39.00-40.00
2 ft and under	43.00-44.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	38.00-39.00
No. 1 machinery	42.00-43.00

Railroad Scrap

Rails, random lengths	53.00-54.00
Rails, 3 ft and under	59.00-60.00
Railroad specialties	43.00-44.00

CINCINNATI

(Buyers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	38.50-39.50
No. 2 heavy melting	33.50-34.50
No. 1 bundles	38.50-39.50
No. 2 bundles	26.00-27.00
No. 1 busheling	38.50-39.50
Machine shop turnings	*18.00-19.00*
Mixed borings, turnings	*17.00-18.00*
Short shovel turnings	*20.00-21.00*
Cast iron borings	*17.00-18.00*
Low phos. 18 in.	42.00-43.00

Cast Iron Grades

No. 1 cupola	42.00-43.00
Heavy breakable cast	34.00-35.00
Charging box cast	34.00-35.00
Drop broken machinery	46.00-47.00

Railroad Scrap

No. 1 R.R. heavy melt.	42.00-43.00
Rails, 18 in. and under	53.00-54.00
Rails, random lengths	43.00-44.50

HOUSTON

(Brokers' buying prices; f.o.b. cars)

No. 1 heavy melting	*38.00*
No. 2 heavy melting	*33.00*
No. 1 bundles	32.00
No. 2 bundles	*24.00*
Machine shop turnings	*16.00-17.00*
Short shovel turnings	*20.00*
Low phos. plates & structurals	39.00

Cast Iron Grades

No. 1 cupola	*46.00*
Heavy breakable	39.00†
Foundry malleable	*58.00*
Unstripped motor blocks	*37.00*

Railroad Scrap

No. 1 R.R. heavy melt.	34.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*25.00*
No. 2 heavy melting	*22.50*
No. 1 bundles	*25.00*
No. 2 bundles	*21.00*
No. 1 busheling	*25.00*
Machine shop turnings	*7.00-8.00*
Short shovel turnings	*8.00-9.00*
No. 1 cast	30.00
Mixed cupola cast	29.00
No. 1 machinery cast	36.00-38.00

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*34.00-35.00*
No. 2 heavy melting	*25.00-26.00*
No. 1 bundles	*35.00-36.00*
No. 2 bundles	*22.00-23.00*
No. 1 busheling	*33.00-34.00*
Machine shop turnings	11.00-12.00
Mixed borings, turnings	12.00-13.00
Short shovel turnings	13.00-14.00
Punchings & plate	*33.00-34.00*

Cast Iron Grades

No. 1 cupola	38.00-39.00
Stove plate	29.00-30.00
Charging box cast	29.00-30.00
Heavy breakable	28.00-29.00
Unstripped motor blocks	18.00-19.00
Clean auto cast	40.00-41.00

SEATTLE

No. 1 heavy melting	30.00†
No. 2 heavy melting	28.00†
No. 1 bundles	22.00†
No. 2 bundles	20.00†
Machine shop turnings	9.00-10.00†
Mixed borings, turnings	9.00-10.00†
Electric furnace No. 1	38.00

Cast Iron Grades

No. 1 cupola	31.00
Heavy breakable cast	28.00
Unstripped motor blocks	23.00
Stove plate (f.o.b. plant)	21.00

LOS ANGELES

No. 1 heavy melting	32.00
No. 2 heavy melting	30.00
No. 1 bundles	28.00
No. 2 bundles	20.00
Machine shop turnings	11.00
Shoveling turnings	11.00
Cast iron borings	11.00
Cut structurals and plate 1 ft and under	45.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	41.00

Railroad Scrap

No. 1 R.R. heavy melt.	32.00

SAN FRANCISCO

No. 1 heavy melting	32.00
No. 2 heavy melting	30.00
No. 1 bundles	30.00
No. 2 bundles	22.00
Machine shop turnings	15.00
Mixed borings, turnings	15.00
Cast iron borings	15.00
Heavy turnings	15.00
Short shovel turnings	15.00
Cut structurals, 3 ft	40.00

Cast Iron Grades

No. 1 cupola	42.00
Charging box cast	34.00
Stove plate	34.00
Heavy breakable cast	28.00
Unstripped motor blocks	31.00
Clean auto cast	40.00
Drop broken machinery	40.00
No. 1 wheels	34.00

HAMILTON, ONT.

No. 1 heavy melting	30.00
No. 2 heavy melting	26.00
No. 1 bundles	30.00
No. 2 bundles	23.00
Mixed steel scrap	25.00
Mixed borings, turnings	15.00
Busheling, new factory: Prepared	30.00
Unprepared	24.00
Short steel turnings	19.00

Cast Iron Grades‡

No. 1 machinery cast	45.00-50.00

*Brokers' buying price.
†Nominal.
‡F.o.b. Hamilton, Ont.

STAINLESS COSTS LESS THAN ALUMINUM—

Do you know that the square-foot cost of stainless steel sheet for curtain wall panels is usually equal to or lower than aluminum when compared in thicknesses of equal indentation resistance? For example, Type 302 stainless steel, .022″ thick is equal to .051″ aluminum and costs only 62¢ per sq. ft., as compared to 67¢ per sq. ft. for 3003-H14 anodized aluminum.

For additional information on all gauges, fill in and mail the coupon.

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Please send me full information on comparative costs of stainless steel vs. aluminum for curtain wall panels.

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New Goal: Aluminum Bridges

Spurred by increased highway building, the industry has set its sights on capturing a large portion of this construction market. Metalmen see August sales as only fair

Nonferrous Metal Prices, Pages 144 & 145

ALUMINUM producers are casting an appraising eye on bridge construction as a potential large application. Some industry people think it could become a major market.

Where—There is a definite trend toward greater use of aluminum in bridges. Chief applications include railings, lighting standards, grating, access stairs, chain link fence, and paint.

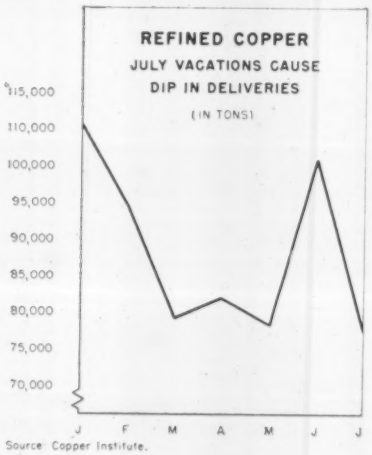
The recently opened Walt Whitman Bridge in Philadelphia has 1 million lb of aluminum in it. The Greater New Orleans Bridge took 600,000 lb—for example, 85,000 lb went into lighting standards and railings, 63,000 lb into grating on the safety walk, 110,000 lb into access ladders and inspection walks, and 10,000 lb into chain link fence.

Potential—Producers believe the large tonnage market involves the main structural material in bridges. So far, the only bridge of this type in the U. S. is under construction at Des Moines, Iowa. It will be a four-span, continuous aluminum girder structure with a reinforced concrete deck. Dimensions: 222 ft long, 36 ft wide, with a 30 ft roadbed.

Aluminum companies say there's no technical reason why the metal can't be employed as the main structural material for any bridge. The big hitch has been that it is not competitive with steel in initial cost. But producers say they hope to tip the balance by designing bridges that take advantage of aluminum's physicals.

Selling Points—Producers claim aluminum bridges offer: 1. More corrosion resistance. 2. Less maintenance. 3. Lighter construction. 4. Easier transport of prefabricated sections to sites. 5. Lower erection costs.

One thing's certain: The industry is making an all-out effort to woo this market. Look for at least two significant announcements in the near future on technical advances in aluminum bridge construction—one from a joint industry committee, the other from a company.



Source: Copper Institute.

Market Rundown

Major nonferrous metals are moving better than they did earlier this year, but the upturn is slow. The pattern of the last few weeks has been one of sporadic buying—a week or two of good sales, then a slump. Here's the situation in four metals.

Copper—August sales of primary producers are going along at a pretty fair clip. Expectations are the month should end up quite a bit better than July but a little under June. Custom smelters are booking what they say is a "satisfactory amount of business." Prices appear stable for the moment.

As expected, July sales turned out to be the poorest of the year because of vacation shutdowns by brass mills and other large copper consumers (see chart). On the bright side, U. S. production of crude primary fell to the lowest point of the year (64,416 tons), and refined stocks dropped for the second straight month to 242,781 tons. Foreign production increased for the third consecutive month, as did refined production and shipments to fabricators. However, foreign stocks also advanced slightly.

Lead, Zinc—Sales of both metals are only so-so. August started off with a flurry for many producers, but it will end up as only a mediocre month unless there's a buying spurt soon.

After several weeks of strength in overseas prices, the London Metal Exchange has fallen to where it's profitable to bring foreign metal into the U. S. and sell at under the domestic price. The lead price should hold for a while, but don't be surprised if zinc drops off.

Nickel—July was generally poor for the industry because of customer vacations. There has been a little improvement this month, but sales are still disappointing. One indication: Production of nickel oxide sinter and powder at the government's facility at Nicaro, Cuba, has been reduced from an operating rate of 55 million lb a year to 32 million lb.

NONFERROUS PRICE RECORD

	Aug. 20 Price	Last Change	Previous Price	July Avg	June Avg	Aug., 1957 Avg
Aluminum	24.70	Aug. 1, 1958	24.00	24.000	24.000	28.100
Copper	26.50	Aug. 6, 1958	26.50-27.00	26.125	25.400	28.639
Lead	10.55	Aug. 13, 1958	10.80	10.800	11.040	13.800
Magnesium	35.25	Aug. 13, 1956	33.75	35.250	35.250	35.250
Nickel	74.00	Dec. 6, 1956	64.50	74.000	74.000	74.000
Tin	94.50	Aug. 20, 1958	94.25	94.950	94.701	94.259
Zinc	10.00	July 1, 1957	10.50	10.000	10.000	10.000

Quotations in cents per pound based on: COPPER, mean of primary and secondary, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary pig, 99.5+%, f.o.b. shipping point; MAGNESIUM, pig, 99.8%, Velasco, Tex.

BRIDGEPORT BRASS
COPPER ALLOY BULLETIN

Bridgeport Brass Co. Reporting New Developments in Copper-Brass Alloys and Metalworking Methods

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AComa 2-4108

Los Angeles 22, Calif.
6500 E. Flotilla Street
RAymond 3-5101
PArkview 1-5171

Minneapolis 15, Minn.
124 12th Ave., South
FEderal 9-7061

Newark (Hillside), N. J.
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Bigelow 3-0044

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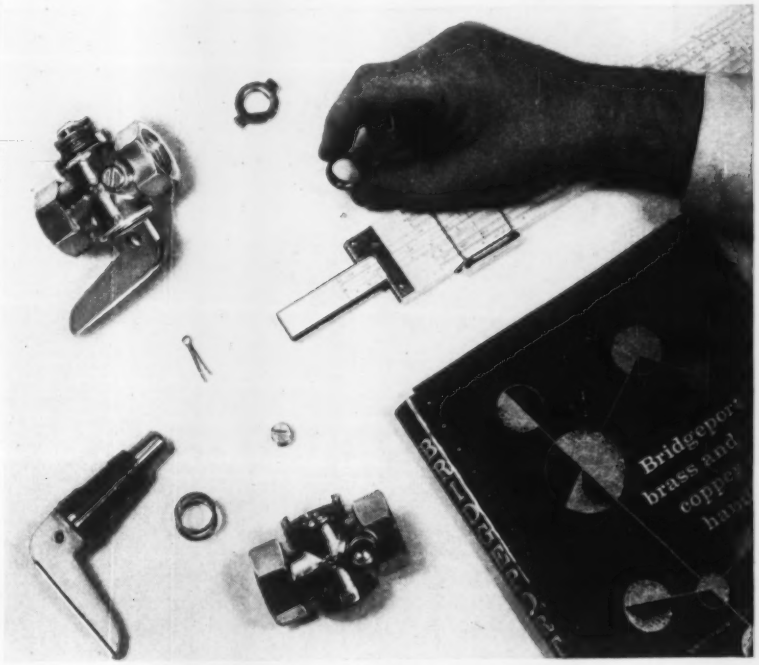

Every Product Should Take Advantage of Today's Favorable Cost of Solid Brass

Of all the qualities that recommend brass for finished products and parts, price is now one of its most attractive.

Price—a vitally important element in any product—puts brass within immediate reach of all manufacturers who find that quality, cost and availability are essential to the success of *their* products or parts.

Consider these advantages offered to you now by Bridgeport as a prime supplier of copper and brass:

1. A newly installed Sendzimir Mill and continuous strip annealer that deliver high-quality brass strip under close gage and grain size control.
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BRIDGEPORT BRASS

Bridgeport Brass Company, Bridgeport 2, Connecticut • Sales Offices in Principal Cities
In Canada: Noranda Copper and Brass Limited, Montreal

Nonferrous Metals

Cents per pound, carlots except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99.5%, pigs, 24.70; ingots, 26.80, 30,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 28.60; No. 43, 28.40; No. 195, 29.40; No. 214, 30.20; No. 356, 28.60, 30 or 40 lb ingots.

Antimony: R.M.M. brand, 99.5%, 29.00; Lone Star brand, 29.50; f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 23.50-24.50, New York, duty paid, 10,000 lb or more.

Beryllium: 97% lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $74.75 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.25% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per ton, ton lots.

Cadmium: Sticks and bars, $1.55 per lb deld.

Cobalt: 97.99%, $2.00 per lb for 550-lb keg; $2.02 per lb for 100 lb case; $2.07 per lb under 100 lb.

Columbium: Powder, $55-85 per lb, nom.

Copper: Electrolytic, 26.50 deld.; custom smelters, 26.50; lake, 26.50 deld.; fire refined, 26.25 deld.

Germanium: First reduction, $179.17-197.31 per lb; intrinsic grade, $197.31-220 per lb, depending on quantity.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $70-80 nom. per troy oz.

Lead: Common, 10.55; chemical, 10.65; corroding, 10.65, St. Louis. New York basis, add 0.20.

Lithium: 98 + %, 50-100 lb, cups or ingots, $12; rod, $15; shot or wire, $16. 100-500 lb, cups or ingots, $10.50; rod, $14; shot or wire, $15, f.o.b. Minneapolis.

Magnesium: Pig, 35.25; ingot, 36.00 f.o.b. Velasco, Tex.; 12 in. thick, 59.00 f.o.b. Madison, Ill.

Magnesium Alloys: AZ91A (diecasting), 40.75 deld.; AZ63A, AZ92A, AZ91C (sand casting), 40.75, f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $240-244 per 76-lb flask.

Molybdenum: Unalloyed turned extrusions, 3.75-5.75 in. round, $9.60 per lb in lots of 2500 lb or more, f.o.b. Detroit.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 74.00; 10-lb pigs, unpacked, 78.25; "XX" nickel shot, 79.50; "F" nickel shot for addition to cast iron, 74.50; "F" nickel, 5 lb ingots in kegs for addition to cast iron, 75.50. Prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 1.01. Nickel oxide sinter at Buffalo, New York, or other established U. S. points of entry, contained nickel, 69.60.

Osmium: $70-100 per troy oz nom.

Palladium: $15-19 per troy oz.

Platinum: $62-65 per troy oz from refineries.

Radium: $16-21.50 per mg radium content, depending on quantity.

Rhodium: $118-125 per troy oz.

Ruthenium: $45-55 per troy oz.

Selenium: $7.00 per lb, commercial grade.

Silver: Open market 88.625 per troy oz.

Sodium: 17.00 c.l.; 19.00-19.50 l.c.l.

Tantalum: Rod, $60 per lb; sheet, $55 per lb.

Tellurium: $1.65-1.85 per lb.

Thallium: $7.50 per lb.

Tin: Straits, N. Y., spot and prompt, 94.50.

Titanium: Sponge, 99.3 + % grade A-1, ductile (0.3% Fe max.), 2.05; grade A-2 (0.5% Fe max.), $1.85 per lb.

Tungsten: Powder, 98.8%, carbon reduced, 1000-lb lots, $3.15 per lb nom., f.o.b. shipping point; less than 1000 lb, add 15.00; 99 + % hydrogen reduced, $3.30-3.80.

Zinc: Prime Western, 10.00; brass special, 10.25; intermediate, 10.50, East St. Louis, freight allowed over 0.50 per lb. New York basis, add 0.50. High grade, 11.00; special high grade, 11.25 deld. Diecasting alloy ingot No. 3, 12.25; No. 2, 12.75; No. 5, 12.50 deld.

Zirconium: Sponge, commercial grade, $5-10 per lb.

(Note: Chromium, manganese, and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 23.50-25.25; No. 12 foundry alloy (No. 2 grade), 21.75; 5% silicon alloy, 0.60 Cu max., 24.75; 13 alloy 0.60 Cu max., 24.75; 195 alloy, 25.25-26.00; 108 alloy, 22.25. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 22.75; grade 2, 21.50; grade 3, 20.50; grade 4, 17.75.

Brass Ingot: Red brass, No. 115, 27.00; tin bronze, No. 225, 36.00; No. 245, 30.75; high-leaded tin bronze, No. 305, 31.25; No. 1 yellow, No. 405, 22.75; manganese bronze, No. 421, 24.50.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.50; AZ91C, 41.25; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nom. 1.9% Be alloy.) Strip, $1.845, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.825, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 20,000-lb lots, 31.855; l.c.l., 32.48. Weatherproof, 20,000-lb lots, 33.66, l.c.l., 34.41, before quantity discounts.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $16.25 per cwt; pipe, full coils, $16.25 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill.) Sheets and strip, $8.50-15.95; sheared mill plate, $6.00-9.50; wire, $6.50-11.00; forging billets, $4.10-4.35; hot-rolled and forged bars, $5.25-6.35.

ZINC

(Prices per lb. c.l., f.o.b. mill.) Sheets, 24.00; ribbon zinc in coils, 20.50; plates, 19.00.

ZIRCONIUM

Plate, $12.50-19.20; H.R. strip, $12.50-22.90; C.R. strip $15.90-31.25; forged or H.R. bars, $11.00-17.40.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	126	106	128
Strips, C.R.	124	108	138
Plate, H.R.	120	105	121
Rod, Shapes, H.R.	107	89	109
Seamless Tubes	157	129	200

ALUMINUM

Sheets: 1100, 3003, and 5005 mill finish (30,000 lb base; freight allowed).

Thickness Range, Inches	Flat Sheet	Coiled Sheet
0.250-0.136	42.80-47.30	....
0.136-0.096	43.20-48.30	....
0.126-0.103	....	39.20-39.80
0.096-0.077	43.80-50.00	39.30-40.00
0.077-0.068	44.30-52.20	....
0.077-0.061	....	39.50-40.70
0.068-0.061	44.30-52.20	....
0.061-0.048	44.90-54.40	40.10-41.80
0.048-0.038	45.40-57.10	40.60-43.20
0.038-0.030	45.70-62.90	41.00-45.70
0.030-0.024	46.20-53.70	41.30-45.70
0.024-0.019	46.90-56.80	42.40-44.10
0.019-0.017	47.70-54.10	43.00-44.70
0.017-0.015	48.60-55.00	43.80-45.50
0.015-0.014	49.60	44.80-46.50
0.014-0.012	50.80	45.50
0.012-0.011	51.80	46.70
0.011-0.0095	53.30	48.10
0.0095-0.0085	54.60	49.60
0.0085-0.0075	56.20	50.80
0.0075-0.007	57.70	52.30
0.007-0.006	59.30	53.70

ALUMINUM (continued)

Plates and Circles: Thickness 0.250-3 in., 24-60 in. width or diam., 72-240 in. lengths.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	42.40	47.20
5050-F	43.50	48.30
5004-F	44.50	50.20
5052-F	45.10	50.90
6061-T6	45.60	51.70
2024-T4	49.30	56.10
7075-T6*	57.60	64.70

*24-48 in. width or diam., 72-180 in. lengths.

Screw Machine Stock: 30,000 lb base.

Diam. (in.) or across flats*	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
0.125	76.90	73.90	....	....
0.250	62.00	60.20	89.10	76.60
0.375	61.20	60.00	73.50	68.50
0.500	61.20	60.00	73.50	68.50
0.625	61.20	60.00	69.80	64.20
0.750	59.70	58.40	63.60	60.40
0.875	59.70	58.40	63.60	60.40
1.000	59.70	58.40	63.60	60.40
1.125	57.30	56.10	61.50	58.30
1.250	57.30	56.10	61.50	58.30
1.375	57.30	56.10	61.50	58.30
1.500	57.30	56.10	61.50	58.30
1.625	55.00	53.60	....	56.20
1.750	55.00	53.60	60.30	56.20
1.875	55.00	53.60	....	56.20
2.000	55.00	53.60	60.30	56.20
2.125	53.50	52.10	....	....
2.250	53.50	52.10	....	56.20
2.375	53.50	52.10	....	....
2.500	53.50	52.10	....	56.20
2.625	....	50.40	....	....
2.750	51.90	50.40	....	56.20
2.875	....	50.40	....	....
3.000	51.90	50.40	....	56.20
3.125	....	50.40	....	....
3.250	....	50.40	....	....
3.375	....	50.40	....	....

*Selected sizes.

Forging Stock: Round, Class 1, random lengths, diam. 0.375-8 in., "F" temper; 2014, 42.20-55.00; 6061, 41.60-55.00; 7075, 61.60-75.00; 7070, 66.60-80.00.

Pipe: ASA schedule 40, alloy 6063-T6, standard lengths, plain ends, 90,000 lb base, dollars per 100 ft. Nominal pipe sizes: ¾ in., 18.85; 1 in., 29.75; 1¼ in., 40.30; 1½ in., 48.15; 2 in., 58.30; 4 in., 160.20; 6 in., 287.55; 8 in., 432.70.

Extruded Solid Shapes:

Factor	Alloy 6063-T5	Alloy 6062-T6
9-11	42.70-44.20	51.30-55.50
12-14	42.70-44.20	52.00-56.50
15-17	42.70-44.20	53.20-58.20
18-20	43.20-44.70	55.20-60.80

MAGNESIUM

Sheet and Plate: AZ31B standard grade, 0.32 in., 103.10; .081 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.0 in., 67.90. AZ31B spec. grades, .032 in., 171.30; .081 in., 108.70; .125 in., 98.10; .188 in., 95.70; .250-2.00 in., 93.30. Tread plate, 60-192 in. lengths, 24-72 in. widths; .125 in., 74.90; .188 in., 71.70-72.70; .25-.75 in., 70-60-71.60. Tooling plate, .25-3.0 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grade (AZ31B)
6-8	69.60-72.40	84.60-87.40
12-14	70.70-73.00	85.70-88.00
24-26	75.60-76.30	90.60-91.30
36-38	89.20-90.30	104.20-105.30

NONFERROUS SCRAP

DEALER'S BUYING PRICES

(Cents per pound, New York, in ton lots.)

Copper and Brass: No. 1 heavy copper and wire, 20.00-20.50; No. 2 heavy copper and wire, 18.25-18.75; light copper, 16.25-16.75; No. 1 composition red brass, 16.50-17.00; No. 1 com-

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES e (Based on copper at 26.50c)		
	Sheet, Strip, Plate	Rod	Wire	Seamless Tubes	Clean Heavy	Rod Ends	Clean Turnings
Copper	49.63b	46.86c	....	49.82	22.500	22.500	21.750
Yellow Brass	43.57	29.28d	44.11	46.48	17.000	16.750	15.250
Low brass, 80%	46.03	45.97	46.57	48.84	19.000	18.750	18.250
Red Brass, 85%	46.89	46.83	47.43	49.70	19.750	19.500	19.000
Com. Bronze, 90%	48.30	48.24	48.84	50.86	20.625	20.375	19.875
Manganese Bronze	51.52	45.74	56.18	....	15.625	15.375	14.875
Muntz Metal	45.95	41.76	....	....	15.875	15.625	15.125
Naval Brass	47.83	42.14	54.89	50.99	15.625	15.375	14.875
Silicon Bronze	54.37	53.56	54.41	56.29	22.125	21.875	21.125
Nickel Silver, 10%	58.82	61.15	....	....	22.000	21.750	11.000
Phos. Bronze, A-5%	68.59	69.09	69.09	70.27	23.375	23.125	22.125

a. Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb.

positions turnings, 15.50-16.00; new brass clippings, 14.00-14.50; light brass, 9.75-10.25; heavy yellow brass, 11.50-12.00; new brass rod ends, 12.00-12.50; auto radiators, unsweated, 13.50-14.00; cocks and faucets, 13.50-14.00; brass pipe, 13.50-14.00.

Lead: Heavy, 7.25-7.75; battery plates, 2.75-3.00; linotype and stereotype, 9.00-9.50; electrotype, 7.25-7.75; mixed babbitt, 9.00-9.50.

Monel: Clippings, 28.00-29.00; old sheets, 25.00-26.00; turnings, 20.00-23.00; rods, 28.00-29.00.

Nickel: Sheets and clips, 42.00-45.00; rolled anodes, 42.00-45.00; turnings, 37.00-40.00; rod ends, 42.00-45.00.

Zinc: Old zinc, 3.00-3.25; new diecast scrap, 2.75-3.00; old diecast scrap, 1.50-1.75.

Aluminum: Old castings and sheets, 9.25-10.00; clean borings and turnings, 6.00-6.50; segregated low copper clips, 16.50-17.00; segregated high copper clips, 15.00-15.50; mixed low copper clips, 12.25-13.25; mixed high copper clips, 14.50-15.00.

(Cents per pound, Chicago)

Aluminum: Old castings and sheets, 10.50-11.00; clean borings and turnings, 9.50-10.00; segregated low copper clips, 16.50-17.00; segregated high copper clips, 15.00-15.50; mixed low copper clips, 15.00-15.50; mixed high copper clips, 14.50-15.00.

(Cents per pound, Cleveland)

Aluminum: Old castings and sheets, 9.25-10.00; clean borings and turnings, 8.50-9.00; segregated low copper clips, 13.50-14.00; segregated high copper clips, 12.00-12.50; mixed low copper clips, 12.00-12.50; mixed high copper clips, 11.00-11.50.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5 % Be, 52.50; light scrap, 47.50; turnings and borings, 32.50.

Copper and Brass: No. 1 heavy copper and wire, 22.25; No. 2 heavy copper and wire, 21.25; light copper, 19.00; refinery brass (60% copper) per dry copper content, 20.25.

INGOTMAKERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 22.25; No. 2 heavy copper and wire, 21.25; light copper, 19.00; No. 1 composition borings, 18.50; No. 1 composition solids, 19.00; heavy yellow brass solids, 13.00; yellow brass turnings, 12.00; radiators, 15.00.

PLATING MATERIALS

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.55. **Copper:** Flat-rolled, 43.29; oval, 41.50, 5000-10,000 lb; electrodeposited, 35.25, 2000-5000 lb lots; cast, 37.75, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 100 lb, 114.25; 100-499 lb, 112.00; 500-4999 lb, 107.50; 5000-29,999 lb, 105.25; 30,000 lb, 103.00. Carbonized, deduct 3 cents a lb.

Tin: Bar or slab, less than 200 lb, 112.50; 200-499 lb, 111.00; 500-999 lb, 110.50; 1000 lb or more, 110.00.

Zinc: Balls, 16.00; flat tops, 16.00; flats, 19.25; ovals, 18.50, ton lots.

CHEMICALS

Cadmium Oxide: $1.55 per lb in 100-lb drums.

Chromic Acid (flake): 100-2000 lb, 31.00; 2000-10,000 lb, 30.50; 10,000-20,000 lb, 30.00; 20,000 lb or more, 29.50.

Copper Cyanide: 100-200 lb, 65.90; 300-900 lb, 63.90; 1000-19,900 lb, 61.90.

Copper Sulphate: 100-1900 lb, 14.05; 2000-5900 lb, 12.05; 6000-11,900 lb, 11.80; 12,000-22,900 lb, 11.55; 23,000 lb or more, 11.05.

Nickel Chloride: 100 lb, 48.50; 200 lb, 46.50; 300 lb, 45.50; 400-999 lb, 43.50; 10,000 lb or more, 40.50.

Nickel Sulphate: 5000-22,000 lb, 29.00; 23,000-35,900 lb, 28.50; 36,000 lb or more, 28.00.

Sodium Cyanide (Cyanobrik): 200 lb, 20.80; 400-800 lb, 19.80; 1000-19,800 lb, 18.80; 20,000 lb or more, 17.80.

Sodium Stannate: Less than 100 lb, 72.50; 100-600 lb, 66.20; 700-1900 lb, 63.50; 2000-9900 lb, 61.60; 10,000 lb or more, 60.30.

Stannous Chloride (anhydrous): 25 lb, 150.10; 100 lb, 145.30; 400 lb, 142.80; 800-19,900 lb, 101.90; 20,000 lb or more, 95.80.

Stannous Sulphate: Less than 50 lb, 135.50; 50 lb, 105.50; 100-1900 lb, 103.50; 2000 lb or more, 101.50.

Zinc Cyanide: 100-200 lb, 59.00; 300-900 lb, 57.00.

(*Concluded from Page 139*)

causing a price jump for the first time since June. Based on the mill purchase, brokers' buying prices rose to $39 for No. 1 heavy melting, $34 for No. 2 heavy melting, $25 for No. 2 bundles, and $21 for crushed turnings.

Gulf Coast export market is dead, although reports are circulating that Japan is seeking a deal for 12 cargoes. If a contract is made, some of the scrap might come from the Gulf area.

Mexican mills are running at 100 per cent of capacity. South-of-the-border buyers have hiked their bids for Texas scrap. Brokers at Laredo are paying up to $42 a gross ton for No. 1 heavy melting.

Los Angeles—Supplies are plentiful here, but trading remains depressed. Collections continue well below the seasonal norm.

San Francisco—No one in the local scrap industry looks for anything to happen for the next 30 days—maybe longer. Mills are loaded with material, and the export market is not taking much. Japan wants more scrap but doesn't want to pay any more than the going domestic price.

Seattle — Inventories are ample, receipts small, sales infrequent, and prices continue to be nominal. Exporters are marking time. Dealers hesitate to make predictions, but their general outlook for the balance of this year is pessimistic.

Pig Iron . . .

Pig Iron Prices, Page 134

Merchant iron trade remains quiet. Foundries are operating at reduced levels and are still awaiting the anticipated pickup in orders from automotive casting producers.

With September near, an improvement in pig iron business is expected. The vacation period of pig iron consumers and their customers is about over. The fall trend is usually a rising one, generally hitting its peak in October. Last fall was an exception.

Foundries continue to use a high ratio of cast scrap in their melts, reducing the need for pig iron. But with cast scrap prices edging upward in several districts, the appeal of cast vs. iron will diminish.

Merchant iron makers are shipping chiefly from inventories and

RAIL
& ALL TRACK EQUIPMENT
Nation's Largest Warehouse Stocks
L. B. FOSTER CO.
PITTSBURGH 30 • ATLANTA 8 • NEW YORK 7
CHICAGO 4 • HOUSTON 2 • LOS ANGELES 5

MANUFACTURING EXECUTIVE

Manufacture of pipe fittings for power plant and oil refinery usage. Know equipment and methods; able to plan and direct entire operation; recommend process, equipment, and methods changes; train personnel; control quantity, quality, and costs of production.

Good opportunity to advance with well-established reputable firm. Starting salary in accord with present qualifications; increases in accord with progress made; bonus and fringe benefits added.

Relocation costs paid; placement fee a negotiable item.

Replies absolutely confidential; our employees know of this opening. Please forward information relative to experience, abilities, education, and salary requirements.

Reply Box 683, STEEL
Penton Bldg. Cleveland 13, Ohio

MANUFACTURERS' REPRESENTATIVES

To sell new line of precision finishing barrel and wet blast machines, media compounds, abrasives, offered by 50-year leader in metal cleaning and finishing. Backed by national advertising, many sales aids. Steady income through repeat sales of supplies. Several excellent territories open. Send information including experience in metal finishing, territory covered, customers, lines carried, references.

TECHLINE Div. of WHEELABRATOR CORP.
2400 Ave. V, Vicksburg, Mich.

MACHINE TOOL SALESMEN and REPRESENTATIVES WANTED

Excellent opp'ty to represent leading mach'y firm in your area with full established line of NEW equipment (and/or used.). Only apply if you have top sales record. Send all details first letter. Correspondence confidential. Write: L. D. Srybnik, S & S Machinery Co., 140—53rd St., Brooklyn 32, N. Y.

CLASSIFIED

Help Wanted

FORGE SHOP SUPERINTENDENT
DIE ROOM FOREMAN
PLANT ENGINEER
METALLURGIST

for successful New York State manufacturer of drop and upset forgings. Must have experience. Write giving complete resume, place of employment, phone number, salary, etc. Address Box 684, STEEL, Penton Bldg., Cleveland 13, Ohio.

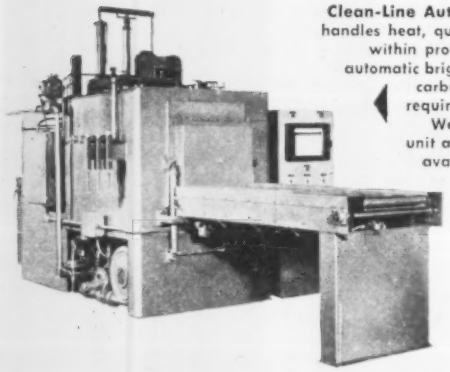
WORKS MANAGER

Experienced man for small merchant bar mill manufacturing bars and small shapes. Send resume giving details to: Box 686, STEEL, Penton Bldg., Cleveland 13, Ohio.

PLANT ENGINEER

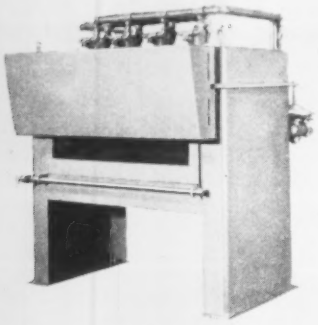
MECHANICAL ENGINEER with at least 15 years' experience in steel mill operations for small rolling mill in Midwest area ready for expansion program. Experience should cover electrical, furnace and regular mill equipment. Write complete details, experience, salary expected, and when available. Reply held in strictest confidence. Write Box 685, STEEL, Penton Bldg., Cleveland 13, Ohio.

HEVI-DUTY ANNOUNCES
the addition of fuel-fired furnaces to its line



Clean-Line Automatic Heat Treating Unit handles heat, quench and draw cycles — all within protective atmosphere. Ideal for automatic bright hardening, carbonitriding, carburizing and other operations requiring temperatures to 1850°F. Washer, atmosphere tempering unit and atmosphere generator are available for a complete system.

Melting Furnaces — rigid or tilting types, manual or power-operated. Included are *crucible furnaces* and *dry hearth furnaces* for melting aluminum and other soft metals.



Forging Furnaces include adjustable slot forges and rod end forges with operating temperatures to 2200°F.

Hevi-Duty has added to its well-established line of electric heat treating furnaces, a complete range of quality *fuel-fired* furnaces for heat treating, melting and forging, through the purchase of the Industrial Furnace Division of Eclipse Fuel Engineering Company, Rockford, Illinois.

Hevi-Duty will manufacture and sell all types of furnaces formerly built by Eclipse and will provide service and replacement parts for any Eclipse furnaces now in operation.

The acquisition will enable Hevi-Duty to better serve the growing needs for industrial heat. For more information, call your nearest district office or write Hevi-Duty Electric Company, Post Office Box 563, Milwaukee 1, Wisconsin.

- Heat Processing Furnaces
- Dry Type Transformers
- Constant Current Regulators

HEVI-DUTY ELECTRIC CO.
Milwaukee 1, Wisconsin

are taking their time in putting blast furnaces back into production. Indications are that a few will resume operations within a month or two, including one or two merchant stacks in the Buffalo district.

The Warren, Ohio, blast furnace of Republic Steel Corp. set a corporation production record for a single furnace in July when it produced 65,755 tons of pig iron. The previous record (62,092 tons) was set by the same furnace in March.

Other Republic furnaces set plant records last month: No. 5 stack at Cleveland, 57,276 tons; single blast furnace at the South Chicago, Ill., steel plant, 54,770 tons; and No. 2 furnace at Gadsden, Ala., 32,250 tons.

Iron Ore . . .

Iron Ore Prices, Page 135

As of Aug. 15, 166 ore vessels were in commission, compared with 163 a month earlier and 249 as of Aug. 15, 1957. The tonnage in commission is 71.7 per cent of the total trip capacity of the fleet (2,978,835 tons). A year ago trip capacity was 2,970,860 tons with 99.38 per cent in commission.

Ferroalloys . . .

Ferroalloy Prices, Page 136

Seven standard types of molybdenum metal powder have been added by Sylvania Electric Products Inc., Towanda, Pa., to its line of metallurgical materials for the electronic, electrical, and related industries. The powders, all hydrogen reduced, include: Type No. 1500, 99.5 per cent minimum purity, $3.35 per lb; No. 1501, 99.5 per cent, $3.40; No. 2800, 99.8 per cent, $3.50; No. 2803, 99.8 per cent, $3.90; No. 3900, 99.9 per cent, $3.70; No. 3901, 99.9 per cent, $3.75; No. 3903, 99.9 per cent, $4.10.

Barrel Shipments Rising

The movement of steel shipping barrels and drums in May totaled 2,731,876 units, up 6 per cent over April, but 15 per cent below May, 1957, reports the U. S. Census Bureau. April shipments were 2,587,192 units; shipments in May last year were 3,209,498.

Shipments in the first five months were 12,762,252 units, vs. 15,506,606 in the year-ago period.

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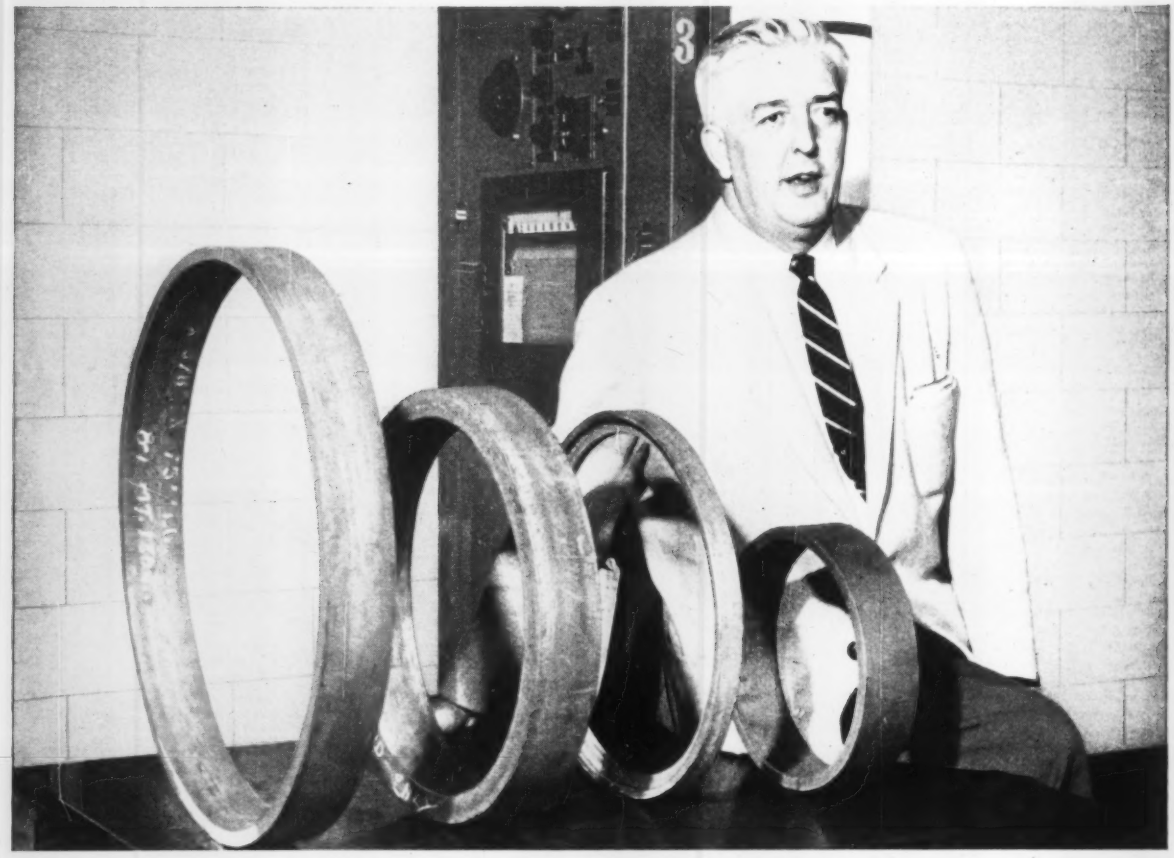
TO FIND THE MAN YOU NEED . . .

Place an advertisement in the "Help Wanted" columns of STEEL's classified pages. Your advertisement will reach the qualified men you need, because STEEL is addressed to highly-trained men in all phases of metalworking

STEEL
The Metalworking Weekly



John E. Gibbons, Vice President, King Fifth Wheel Co., tells . . .

Why we chose General Electric to vacuum-melt the super alloy for these jet engine parts

"King Fifth Wheel cold-forms rectangular bar stock into rings for after-burner sections, rear frames, and other jet engine parts. We were using René 41,* the strongest vacuum-melted high-temperature alloy that can be formed, forged, and welded.

"But, we were running into trouble in the rolling operation. And rejects were raising cain with our delivery schedule. So we called in another supplier, General Electric – the original developer of René 41 vacuum-melted alloy.

"G.E. supplied us with material of consistently high quality. And, their engineers worked closely with us to help iron out fabrication problems. Today, thanks to the General Electric vacuum-melting service, we've cut rejects to a minimum . . . and we're making on-time deliveries of a top quality product."

Whatever vacuum-melted alloy your specifications call for, you too can profit from G.E.'s experience and technical know-how in the field of high-temperature alloys. For facts about G.E.'s vacuum-melting and engineering services, write: *Metallurgical Products Department of General Electric Company, 11141 E. 8 Mile Street, Detroit 32, Michigan.*

*Trademark of the General Electric Co.

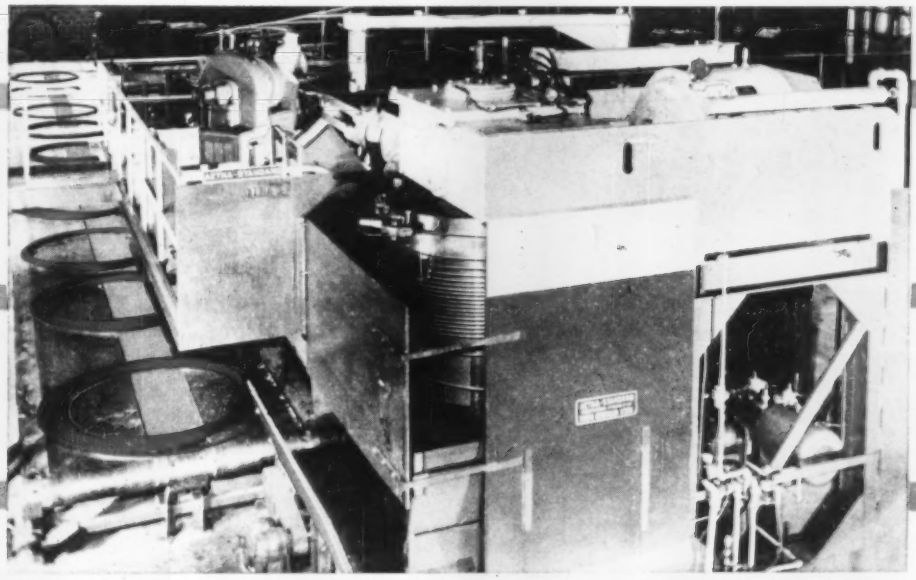
Progress Is Our Most Important Product

GENERAL ELECTRIC

ECONOMICAL PRODUCTION

OF THIN WALL, SMALL

DIAMETER TUBING



One of many Bull Block installations made by Aetna-Standard. Aetna's Bull Blocks range in size from 12" in diameter to 60" in diameter at speeds up to 2,000 feet per minute. Types—Horizontal, Inverted or Vertical.

Coil handling is most important for economy in production with a Bull Block. Aetna's engineers have concentrated on the method of moving the tube from the drum after drawing and the method of transferring the material back to the block. The payoff tray, the ease of entry, and the ease of gripping,ungripping and loading add to the economy of operation.

Our hydraulic feed gives absolute accuracy in traversing the die to the drum during drawing. Unique electrical controls give the operator instant control of speeds from zero to 2,000 feet per minute.

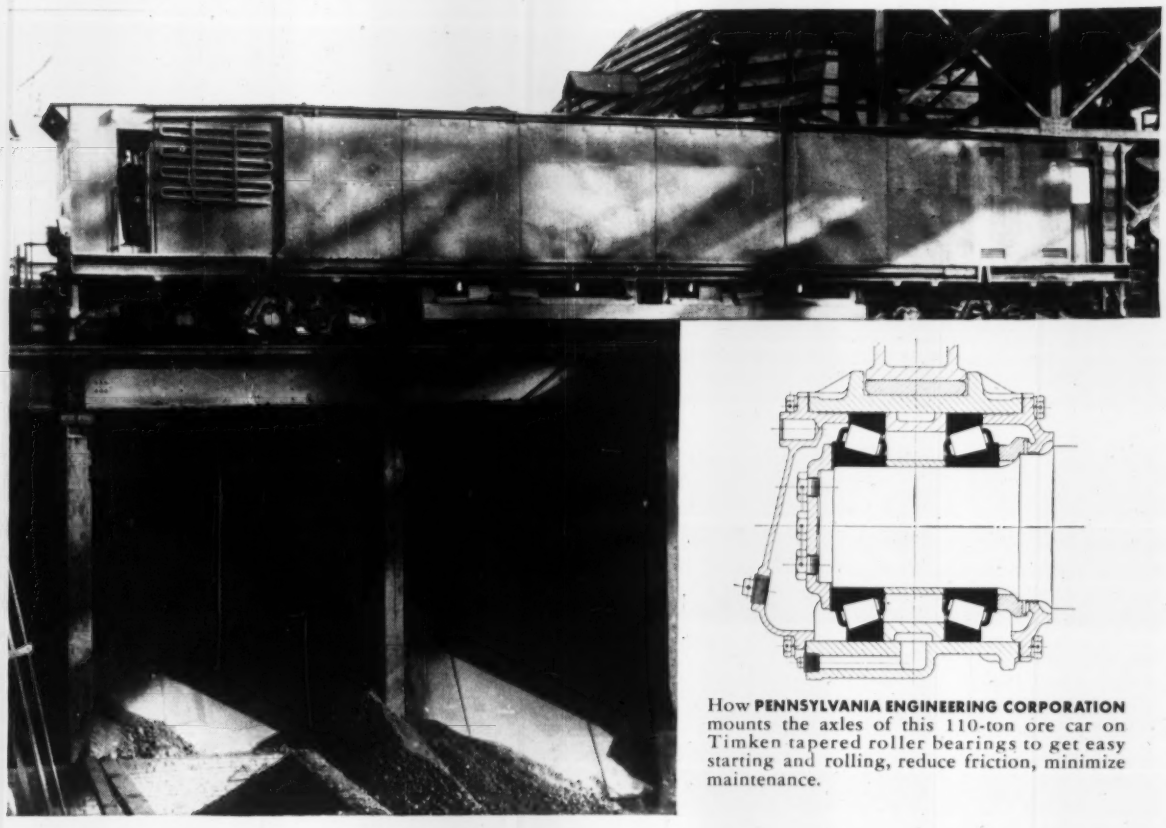
There's nothing new about the use of Bull Blocks. They have been in use for many years. But the design remained unchanged until Aetna-Standard, a pioneer in Drawbenches and other cold draw equipment, completely redesigned the Bull Block and made it a practical unit for high-speed production of small diameter, thin wall tubing. We have made installations for most of the major producers of copper, brass and aluminum tubing.

AETNA • STANDARD

THE AETNA - STANDARD ENGINEERING COMPANY

GENERAL OFFICES: PITTSBURGH, PA. • PLANTS: ELLWOOD CITY, PA., WARREN, OHIO • RESEARCH LABORATORY: AKRON, OHIO

CONTINUOUS GALVANIZING LINES • CONTINUOUS ANNEALING LINES • CONTINUOUS ELECTROLYTIC TINNING LINES • SIDE TRIMMING AND SHEAR LINES AND OTHER FINISHING EQUIPMENT • CONTINUOUS BUTT WELD PIPE MILLS • SEAMLESS TUBE MILLS • DRAWBENCHES AND OTHER COLD DRAW EQUIPMENT • ROLLS AND CASTINGS • EXTRUDERS, MILLS, PRESSES FOR RUBBER, PLASTIC AND CHEMICAL



How **PENNSYLVANIA ENGINEERING CORPORATION** mounts the axles of this 110-ton ore car on Timken tapered roller bearings to get easy starting and rolling, reduce friction, minimize maintenance.

New 110-ton ore car starts easier, rolls smoother and longer on Timken® bearings

BECAUSE this ore car carries a whopping 110-ton load, it has to be easy to start and keep rolling. It's a natural spot for Timken® tapered roller bearings. And it's no wonder that Pennsylvania Engineering Corporation used them on all 6 axles.

Because Timken bearings *roll* the load, starting resistance is cut up to 88%. There's no metal-to-metal sliding friction. Fully loaded cars start easier, with less power loss.

Geometrically designed and precision-made to roll true, Timken bearings virtually eliminate friction. Cars roll smoothly.

And Timken bearings take the tremendous weight and heavy shock loads. Their rollers and races are case-carburized to have hard, wear-resistant surfaces over tough, shock-resistant cores. Full line contact between rollers and races gives Timken bearings *extra* load-carrying capacity. Their taper lets Timken bearings take both radial and thrust loads in any combination. No costly extra thrust devices are needed. Bearing life is longer, maintenance is minimized.

What's more, by holding housings and shafts concentric, Timken bearings make closures more effective. Dirt and dust stay out. Lubricant stays in.

For all these advantages, specify bearings trade-marked "Timken" for the machines you buy or build. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

TIMKEN BEARING EQUIPPED — *This symbol on a product means its bearings are the best*

TIMKEN

TRADE-MARK REG. U.S. PAT. OFF.

TAPERED ROLLER BEARINGS ROLL THE LOAD